NETWORK WORLD

The Newsweekly of User Networking Strategies

Volume 7, Number 11 | An International Data Group Publication | March 12, 1990

In-house tool helps retailer optimize net

By Wayne Eckerson
Senior Writer

FREEPORT, Maine — L.L. Bean, Inc. has developed an analytical model to optimize its telemarketing operation that has helped improve customer service and is expected to boost profits by about $10 million a year.

The model, which is based on advanced queuing theory and resource management principles, has enabled the outdoor goods and apparel retailer to boost the number of calls that are answered during peak periods by 24% and increase revenue by 16%.

The tool has also shortened the average time customers wait on hold during peak calling periods from 90 to 15 seconds, and it has reduced customer call abandonment by 81%.

"The model has created a win-win situation for L.L. Bean and its customers," said Bruce Andrews, associate professor of management science at the University of Southern Maine in Portland and one of the model's three authors. "Customers get better service, and L.L. Bean generates more orders."

The model has been selected as one of 10 finalists in the 1990 Franz Edelman Competi-

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Wal-Mart's Mark Schmidt discusses the retailer's VSAT network.

Wal-Mart net lets company manage chain as one store

The 1,600-node VSAT network orchestrates the flow of goods from suppliers to store shelves.

By Bob Brown
Senior Editor

BENTONVILLE, Ark. — Wal-Mart Stores, Inc.'s headquarters complex, nestled here in the foothills of the Ozark mountains, houses the brains of one of the retail industry's most vaunted networks.

Ironically, information services (IS) executives at the $25.8 billion discount retailer downplay the voice, data and video satellite net as a mere support tool in the company's efforts to hold expenses down and provide superior customer service by tracking sales and minimizing inventory.

"We're doing the same bread-and-butter type of applications other retailers do," said Mark Schmidt, Wal-Mart's senior director of IS. "Customers shouldn't even notice the network."

But the stinginess with which Wal-Mart executives part with details about the net illustrates its strategic importance to the company, the third largest U.S. retailer. So does the $500 million it has invested in IS since 1985.

Wal-Mart's backbone network is a 1,600-node very small aperture terminal network that supports communications between

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FCC moves to relax regulation of AT&T

Multifaceted proposal would let AT&T offer custom deals without tariffs, remove other restrictions.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The FCC last week proposed a sweeping set of rule changes that would give AT&T virtually unlimited freedom to offer nontariffed custom network deals and significantly reduce regulatory oversight of almost all the carrier's other business services.

The proposals are the result of a Federal Communications Commission investigation into competition in the long-distance market, which concluded that the market for business services has become intensely competitive and that existing regulation unnecessarily burdens AT&T.

If the changes are approved, they will represent some of the most far-reaching decisions ever issued by the agency, according to industry analysts.

FCC officials acknowledged that their proposal is significant but denied the changes would deregulate AT&T, as some claim, since several regulated services — such as 800 and international long distance — would remain unchanged.

FCC Commissioner Sherrie Marshall characterized last week's decision as "a managed and careful transition to a competitive marketplace."

Although the full text of the FCC's decision is not likely to be

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EC convinces PTTs to drop price scheme

By Barton Crockett
Senior Editor

BRUSSELS, Belgium — The European Commission last week announced it has persuaded 26 European carriers to abandon an international circuit price-setting mechanism that has allegedly led to overcharging and steep surcharges.

By convincing the carriers to drop their Recommendation on the General Principles for the Lease of International Telecommunications Circuits, European Commission officials predict that private-line prices in Europe may plummet.

"This is a very important decision that should benefit users enormously," said Herbert Ungerer, a division head for the European Commission's Directorate General XIII for information technology, telecommunications and innovation.

Ungerer declined to speculate

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NETLINE

NEWSPAPER

FEATURE

Design tools optimize networks, reduce costs

By Salvatore Salamone
Features Writer

Flying by the seat of your pants may be exciting in a small plane, but in a jumbo jet, it's dangerous.

Similarly, as enterprisewide networks grow in size and complexity, designing them inevitably progresses from a gut-felt approach to a more analytical process. Just as pilots rely on computer software to help fly today's sophisticated planes, network designers are turning to software-based tools to aid them in building today's enterprisewide networks.

Designers and managers are faced with lean budgets and burgeoning networks. They need these sophisticated analytical tools to help them justify to upper management exactly what they want to do and why.

Network design packages, which are useful in designing

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Wang plans to sell InteCom to French telecom giant

Matra Communication seeks unit as vehicle to enter U.S. PBX market; users applaud transfer.

By Bob Brown
Senior Editor

ALLEN, Texas — After more than a year of trying to unload InteCom, Inc., Wang Laboratories, Inc. last week announced plans to sell its private branch exchange subsidiary to Matra Communication, a Paris-based firm.

Wang said it signed a letter of intent with Matra Communication, under which the company would acquire InteCom for an undisclosed amount. Matra Communication is an $850 million subsidiary of electronics and defense company Matra S.A.

Matra Communication is said to be France's second largest supplier of telecommunications equipment. The company, which will run InteCom as a subsidiary, sells a variety of telecommunications gear, including low-end PBXs and public switching systems.

Users said the deal should provide InteCom with stronger financial support than it has received from Wang. It is unclear how the InteCom and Matra Communication product lines will be merged, but Matra's low-end PBX systems are expected to be readied for the American market and fill a hole in InteCom's product line, said Thomas Mayer, InteCom's president and chief executive officer.

Analysts said financially strapped Wang originally had a $100 million asking price on InteCom but probably settled for

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AT&T wrestles switched access SDN time restraints

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T is struggling to streamline the process of providing users with switched access to its Software-Defined Network (SDN) service more than a year after it became the first carrier to offer the key access option.

A manpower-greedy service provisioning process, time-consuming record checking and a service promotion campaign launched last spring have combined to slow provisioning of SDN switched access.

SDN, which supports calls on a switched basis once they are within AT&T's network, was originally designed to be accessed using dedicated facilities.

In late 1988, the carrier introduced switched access, enabling customers to support low-traffic sites.

Users contend that the switched access provisioning process, a task performed by the Bell operating companies at AT&T's request, takes too long and complicates efforts to implement new SDNs and expand existing networks.

Although AT&T has instituted drastic measures to address the issue, current and prospective SDN customers say the switched access problem persists.

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IBM adds 3174 controller to link Token-Rings, host

TokenWay to compete with PC-based gateways.

By Jim Brown
Senior Editor

DALLAS — IBM last week unveiled a 3174 cluster controller designed to link IBM Token-Ring Networks to remote Systems Network Architecture hosts.

The TokenWay 3174, introduced at the Interface '90 Plus show here, will connect as many as 40 devices attached to either a 4M or 16M bit/sec IBM Token-Ring to a remote IBM host at speeds up to 64K bit/sec.

TokenWay 3174 also offers a local coaxial cable port that can be used to link one 3270 terminal to the host or to a 3299 multiplexer. The 3299 enables up to eight 3270 terminals to share the port.

The product is a less expensive version of the larger 3174, which can also be configured as a Token-Ring-to-host gateway.

TokenWay 3174 is designed to compete against microcomputer-based gateways that communicate with the host at up to 19.2K bit/sec.

IBM said it downsized the 3174 and packaged it as a gateway because users have been

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Briefs

Japan singing divestiture tune. Japan's Telecommunications Council, which advises the country's Ministry of Posts and Telecommunications, recently recommended that Nippon Telephone and Telegraph, Ltd. (NTT) be split into three carriers — one each for long-distance, local and mobile communications services.

The council said NTT's dominant position hampers network competition, which has been allowed in Japan since 1985. The recommendation was criticized by Japan's Ministry of International Trade and Industry and NTT President Haruo Yamaguchi, who said "a breakup would preclude the possibility of developing services that range over both inter- and intracity networks," such as Integrated Services Digital Networks. The government could decide the fate of NTT as early as the end of this month.

Colorful fax. Tokyo-based Sharp Corp. announced last week that it will display what it claims is the world's first desktop-sized, full-color facsimile machine at next week's CeBIT '90 show in Hannover, West Germany.

While other full-color fax machines have been used by publishing companies, they are floor-standing machines. Sharp's product will use a proposed standard for color fax and be capable of sending one full-color page over an Integrated Services Digital Network connection in about 20 seconds or over a dial-up line at 14.4K bit/sec in about three minutes. The machine will be available in Japan later this year for about $25,500, twice the cost of existing Group IV fax machines. The company said it has not decided if it will market the machine in the U.S.

Novell profit push. Novell, Inc. last week reported that its first-quarter profits jumped 37% compared to the first quarter in 1989, from $11 million to $15 million. Revenue in the first quarter, which ended Jan. 27, rose 7% to $105 million, compared to $98 million for the first quarter last year. Revenue from overseas operations accounted for 42% of overall revenue, an all-time high.

Raymond Noorda, Novell's chairman, president and chief executive officer, attributed the strong profits to the company's expanding software product line and attention to expense control. Software sales accounted for 72% of Novell's revenue, up from 61% during the first quarter of 1989.

Mexico milks cellular units. The Mexican government last week said it will use the revenues from the sale of cellular telephone operating licenses to upgrade its rickety telecommunications infrastructure. The Mexican Communications Ministry divided the country into eight regions and sold 20-year cellular licenses to eight Mexican and foreign cellular telephone consortiums. The consortiums agreed to pay $55 million in up-front costs for the licenses and a total of $250 million through 1993. The Mexican government will also receive 5% to 10% of future revenues from each consortium.

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Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $3.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35 mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

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Coalition fights proposed bill to lift RBHC restraints

Bill would let RBHCs compete in banned markets.

By Bob Brown
Senior Editor

WASHINGTON, D.C. — A coalition of user and vendor trade groups united here last week to speak out against the "Telecommunications Policy Act of 1990," a draft bill designed to lift business restrictions from the regional Bell holding companies.

The coalition, a 50-member group formed in June 1986 to air concerns about an earlier free-the-Bells bill, called a press conference here to denounce the draft bill two days before it was to be discussed in a public forum for the first time.

The draft bill was prepared by staff members of the House Subcommittee on Telecommunications and Finance and released by Rep. Edward Markey (D-Mass.) in February.

The subcommittee last week invited Alfred Sikes, chairman of the Federal Communications Commission, and Patricia Worthy, chairwoman of the National Association of Regulatory Utility Commissioners' Communications Committee, to comment on the proposal.

The draft bill is designed to spur competition and innovation by letting the RBHCs compete — at least to some extent — in the equipment manufacturing, information services and long-distance markets. It also calls for letting the FCC, rather than the courts, oversee these changes.

The coalition argued that softening the Modified Final Judgment restrictions placed on the RBHCs would be detrimental for users because it would result in fewer choices and higher prices in the network services and equipment market.

Among the coalition's representatives were the International Communications Association (ICA), the country's largest telecommunications users group, and the North American Telecommunications Association (NATA), a trade group of about 700 equipment makers and distributors.

Coalition members acknowledged that their united stand here was partly out of concern that the RBHCs are winning some support in their effort to have some Modified Final Judgment restrictions dropped, but the group noted that the draft bill is "only a draft."

To some observers, the RBHCs have gained some momentum recently. They have joined in a $21 million lobbying and advertising campaign designed to warn consumers and legislators that the existing regulatory environment has weakened the competitiveness of the U.S. telecommunications industry and denied Americans access to innovative tele-

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Aetna and Kodak test wiring spec

By Bob Wallace
Senior Editor

Aetna Life & Casualty and Eastman Kodak Co. have found that the emerging Commercial Building Wiring Standard offers a flexible, vendor-independent alternative to proprietary systems.

Both companies say the standard offers more media options, affords a higher degree of multivendor support and is more comprehensive than structured cabling systems sold by AT&T, IBM, Digital Equipment Corp. and others.

The standard goes beyond proprietary standards by specifying minimum acceptable requirements for wiring and hardware and by referencing existing safety, fire and installation specifications and codes that are designed to protect users from potential problems.

The standard is the culmination of five years of work by a core group of users, including Aetna, and vendors such as AMP, Inc., IBM and Northern Telecom, Inc.

Aetna learned of the standard as it kicked off a four-year renovation project that included plans to rewire its two million sq-ft Hartford, Conn., headquarters and several nearby offices. The company evaluated the emerging standard as well as AT&T's Premises Distribution System, the IBM Cabling System and DEC's DECconnect.

"Although the structure of the cabling systems was essentially the same, the difference was in the media," said Massoud Gaskari, manager for Aetna's renovation project. The vendors recommended different mixes of fiber, unshielded twisted pair, shielded twisted pair and coaxial cable.

"We chose the standard because it offers all of the above without forcing any one vendor's wire and equipment on us," Gaskari said. Aetna has installed wiring systems in four buildings based on the guidelines in the wiring standard and is scheduled to revamp three more buildings.

The combination Aetna went with included fiber backbones between wiring closets and 10 pairs of twisted-pair wire — eight pairs of unshielded wire and two pairs of shielded wire — from each wiring closet to the desktop.

The company had hoped to use only unshielded twisted pair for horizontal wire runs but was forced to add shielded twisted pair to support 16M bit/sec IBM Token-Ring Networks. IBM does not support these LANs on unshielded twisted-pair wire.

Firm foundation

Eastman Kodak used the Commercial Building Wiring Standard as the basis for a cabling specification it issued to its business units in May 1988, according to Bill Freed, manager of network engineering for the firm.

"The situation we faced was everyone thought they were wiring experts," Freed said. "Each vendor was promoting its cabling system as the system of the future. We decided to go with the standard because it was both open and flexible."

The company — which has since issued two updates to the specification, one in Janaury 1989 and the other in July 1989 — recommends that all new buildings and renovated structures be wired based on the standard, Freed said.

"We incorporated much of the standard, including the amount of floor space required for wiring closets to support various office layouts, in the specification," Freed said. Eastman Kodak recommended different maximum wire runs from those specified in the standard.

The Eastman Kodak specification uses fiber and unshielded twisted-pair wire for backbone wiring, and four pairs of unshielded twisted pair and two pairs of shielded twisted pair to the desktop.

"We didn't include fiber for horizontal wiring because standards for fiber such as [the Fiber Distributed Data Interface] were not firm," Freed said.

Multivendor support was a top consideration in Eastman Kodak's decision to go with the wiring standard. "We wanted to create a wiring infrastructure that could support new products as they became available without having to rewire," Freed said. "Some of the systems will support other vendors' equipment, but it's usually not clean."

Eastman Kodak's wiring system supports the company's PBXs from Rolm, an IBM and Siemens AG company, as well as computers from IBM, DEC and Hewlett-Packard Co., Freed said. "We've had a number of buildings in our Copy Products Division wired with our specification last year. Our approach was that when we did renovations, we'd gut entire floors and install new wiring based on the specification," Freed explained.

PSC denies Nynex rate hike; RBHC readies appeal

Nynex to refile proposal this week and double amount sought to offset costs for lengthy appeal.

By Joe Panepinto
Staff Writer

NEW YORK — The New York Public Services Commission (PSC) slammed the door on Nynex Corp.'s $440 million rate hike proposal last week, raising the possibility of a higher rate request by the carrier this week.

The PSC's decision forces Nynex to go through a drawn out rate procedure that may last up to 11 months and cost millions of dollars in legal fees.

In light of the increased cost of the procedure, a spokesman for Nynex said the company is likely to file papers with the PSC by Wednesday, requesting as much as $900 million in general rate increases for residential and business services.

Nynex must file the request quickly if it hopes to institute the increases at the beginning of 1991, the spokesman said.

> The company is expected to request as much as $900 million in general rate increase.
>
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Nynex had been seeking since September to avoid an expensive rate case by pursuing a mutually binding settlement with the PSC.

Although the two sides struck a tentative deal in early December that would have approved the rate hike proposal, last week's decision by the commission rejected that agreement.

Testimony against the agreement from consumer advocates, New York State Attorney General Robert Abrams and a blistering 195-page report prepared by a state administrative judge per-

> The company believed it could request rate increases to cover climbing costs due to depreciation and federal accounting changes.
>
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suaded the commission to rescind its approval.

The amount of the rate increases sought by Nynex has increased steadily, rising from the $359 million requested in September to the $440 million the commission rejected last week.

Although Nynex has not raised rates on most services since 1986 due to a binding moratorium on rate hikes, the company believed it could request rate increases to cover climbing costs due to depreciation, federal accounting changes and subsidized life-line service, the spokesman said.

But last week's decision by the PSC would extend the moratorium until next year and put on hold a $367 million rate reduction that would have eliminated charges for inside wiring and phone equipment.

Texas hospital tests HDTV net for remote diagnosis

By Wayne Eckerson
Senior Writer

HOUSTON — Texas Children's Hospital last week demonstrated a high-definition television (HDTV) network that allowed a medical specialist to diagnose the condition of a patient at a remote clinic.

The first-of-its-kind demonstration, which also marked the establishment of the Center for Remote Medical Consultation at the hospital, showed the potential of HDTV to improve communications between specialists at urban hospitals and direct-care physicians in outlying communities. "The potential exists for this technology to have a tremendous impact on the accessibility of specialty health care, particularly to rural America," said Mark Wallace, executive director and chief executive officer of Texas Children's.

HDTV projects a more detailed and color-true picture than standard television, which some hospitals currently use to conduct re-

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The West Coast office of *Network World* has recently moved. It is now located at 2088 Union St., Suite 2, San Francisco, Calif. 94123; (415) 771-3530.

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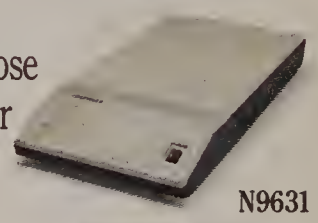
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Photo courtesy of United States Forestry Services.

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See the FAXNeT Form on Page #49

Law firm plans T-1 net to smooth transmission costs

By Tom Smith
New Products Editor

LOS ANGELES — A law firm here last week said it plans to install a seven-site private network based on T-1 and fractional T-1 circuits, which promises to stabilize transmission costs and support different data types.

Paul, Hastings, Janofsky & Walker said the private network will provide greater bandwidth at a lower cost than the combination of leased lines and packet-switched facilities the firm currently uses.

The installation of T-1 multiplexers will also provide the flexibility necessary to support the transmission of synchronous and asynchronous data over the same network.

The net will support transmission of a wide range of data, including word processing files, accounting information, legal documents, electronic mail and bulk file transfers. The new network will give end users better response time and make it easier for them to communicate with their colleagues in other offices.

The $500,000 project, which is expected to be completed by June, would not have been possible without the advent of fractional T-1 services, according to Steve Hauberg, data processing manager for the law firm, which employs 375 attorneys and posted over $100 million in revenue in 1989.

Paul, Hastings, Janofsky & Walker had been weighing installation of a private network, but the firm could not cost-justify T-1 lines for the amount of traffic it generates.

The firm will install a 256K bit/sec fractional T-1 trunk supporting data traffic between regional offices here and in Washington, D.C., according to Mark Cartier, MIS director for the law firm.

The Los Angeles office will also support T-1 links for voice and data traffic to offices in Costa Mesa and Santa Monica, Calif. The Washington hub will be outfitted with 128K bit/sec fractional T-1 links supporting data traffic to Atlanta, New York and Stamford, Conn.

Dedicated circuits will enable the firm to fix its transmission costs, Cartier explained. Data traffic has increased 30% to 40% per year on the user's 9.6K bit/

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Group fights bill to lift restraints

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communications services.

Despite this, Capitol Hill observers say the draft bill has only a slim chance of passing through Congress this session because of other issues considered to be more pressing, such as clean air legislation.

Users applaud the efforts of Congress to study the issue of competition in the telecommunications industry but do not agree with the methods proposed in the draft bill, said Brian Moir, counsel to the ICA.

"Unfortunately, the way we see entry [of more competitors into the market] happening all too often is that we'll end up with less choice, not more," Moir said.

But high-ranking communications officials, including the FCC's Sikes, are backing a change in telecommunications policy.

In his testimony last week, Sikes described the draft bill as "a very positive step forward" and welcomed the opportunity to have the FCC oversee changes in the U.S. telecommunications industry. In particular, Sikes said restrictions on the RBHCs in the information services industry may be creating geographic disparities and impeding public network modernization.

Holding a different view is Warner Sinback, Domestic Communications Committee chairman for Adapso, the computer software and services industry association. He said the draft bill "would create many of the conditions for antitrust abuse, which led to the original 1982 consent order," Sinback said.

Motorola offers 3 RISC-based Unix servers

By Laura DiDio
Senior Editor

NEW YORK — As expected, Motorola, Inc. last week unveiled a trio of Unix servers based on Reduced Instruction Set Computer (RISC) technology and packaged with X/Windows terminals.

The so-called Motorola MultiPersonal Computers (MPC) are available in three models: the MPC-100, MPC-200 and dual-processor MPC-300. The RISC offerings support a client/server architecture, in which X/Windows terminals generate the graphical user interface and the application is run on the server.

The MPC line is designed to work in Ethernet and token-ring local-area networks, enabling X/Windows terminals to exchange files and electronic mail with LAN-attached DOS, OS/2 and Unix workstations, as well as Apple Computer, Inc. Macintoshes. The MPC servers act as gateways to those environments.

Motorola is positioning the servers to compete with IBM's line of RISC System/6000 series workstations, including the new POWERservers announced last month. However, Motorola is packaging each of its MPC servers with three X/Windows display stations and pricing them 35% below comparable IBM servers.

The company is targeting the servers at any commercial user that needs to access disparate types of information from several vendors' computers on a single network.

Three configurations

All three servers, which are scheduled to ship in May, are based on the company's 88000 RISC microprocessor.

The MPC-100 operates at 27 million instructions per second (MIPS), comes equipped with 16M bytes of main memory (expandable to 32M bytes), 300M bytes of hard disk storage (expandable to 1.2G bytes) and one expansion slot. Like all MPC models, it runs Unix and supports the X/Window System Version 11 protocols. It costs $23,985.

The MPC-200 processes 33 MIPS and comes with 16M bytes of memory (expandable to 64M bytes), 600M bytes of hard disk storage (expandable to 2.4G bytes) and has seven expansion slots. It lists for $35,985.

The top-of-the-line MPC-300 offers 67.2 MIPS of performance and has six expansion slots. It has 1.2G bytes of hard disk storage (expandable to 2.4G bytes) and costs $59,985.

Although an Ethernet adapter is bundled with each MPC server, users must buy existing third-party token-ring adapters for these environments.

The MPC servers also feature standard support for the Transmission Control Protocol/Internet Protocol and Sun Microsystems, Inc.'s Network File System, which enables them to send to and receive files from other computers. Additionally, users can purchase optional protocol software from Motorola such as the Government Open Systems Interconnection Profile-compliant version of the OSI protocol stack.

Motorola also offers an optional suite of IBM Systems Network Architecture and Binary Synchronous Communications gateway software supporting LU 6.2 Advanced Program-to-Program Communications, 3270 and Remote Job Entry. This software lets users connect to IBM host systems on the network. Optional software is also available to establish connections from the Motorola servers to X.25 wide-area networks and Digital Equipment Corp.'s DECnet.

Net protocols reside in the server, enabling the MPC units to support file, print and message services between Macintoshes, OS/2 workstations and DEC VAXes. The server also runs Soft PC, system software developed by Insignia Corp. of the U.K. Soft PC lets the server emulate an Intel Corp. 80286 to run DOS applications.

Systems Center puts up $43.5m to take the reins of Net/Master

Company acquires exclusive worldwide marketing rights to Systems Network Architecture net management system.

By Paul Desmond
Senior Writer

RESTON, Va. — Systems Center, Inc. last week announced it has signed an agreement with Cincom Systems, Inc. to acquire the marketing rights to the Net/Master SNA network management system for $43.5 million.

Under the terms of the agreement, Systems Center will acquire exclusive worldwide Net/Master marketing rights, except in Australia and New Zealand, and will assume support for Cincom's Net/Master customer base. In addition, more than 125 Cincom employees dedicated to the Net/Master family of products will be offered jobs with Systems Center, based here.

Late last year, Systems Center announced it was acquiring Software Devel-

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See the FAXNeT Form on Page #49

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Worth Noting

"The cost of [Fiber Distributed Data Interface] adapter boards is expected to fall sharply, from roughly $7,000 this year to an average of $4,816 next year. By 1994, FDDI adapters are projected to cost an average of $995 each."

Mary Modahl
Director
Network Strategy Research
Forrester Research, Inc.
Cambridge, Mass.

People & Positions

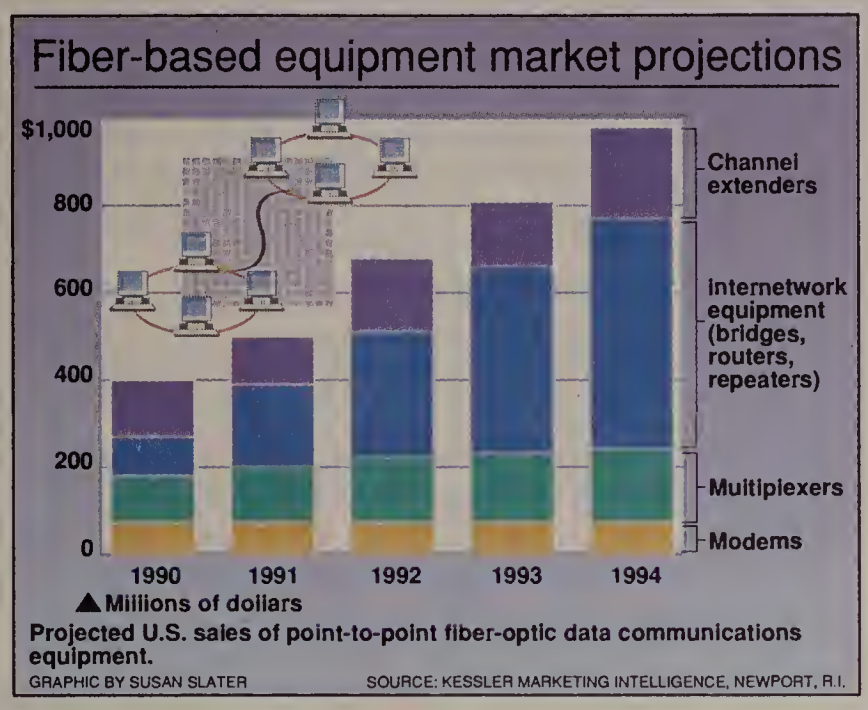
Novell, Inc. last week announced expanded responsibilities for two of its top executives, **Darrell Miller** and **Kanwal Rekhi**, and named **Navin Jain** general manager of its recently formed LANalyzer Products Division.

Miller was promoted to the newly created position of executive vice-president for marketing and services. Under a revised reporting structure at the company, Novell's service and support, training and corporate communications operations will now report to Miller instead of Ray Noorda, chairman, president and chief executive officer. Miller will continue to oversee product development and strategic relations.

Previously, Miller was executive vice-president of Novell's Software Group.

Rekhi, former president and CEO of Excelan, Inc., which merged with Novell in 1989, was named executive vice-president for product development. He will is responsible for all Novell engineering and development efforts.

Jain will head up the LANalyzer Products Division, a dedicated group focusing on network analysis and monitoring tools. Previously, Jain was vice-president of engineering for Excelan.



Projected U.S. sales of point-to-point fiber-optic data communications equipment.

GRAPHIC BY SUSAN SLATER SOURCE: KESSLER MARKETING INTELLIGENCE, NEWPORT, R.I.

Lower prices spur demand for fiber internetwork gear

Costs could drop up to 42% by 1994, study says.

NEWPORT, R.I. — User demand for fiber-optic-based internetwork products is on the rise, spurred by the plummeting prices of fiber-based bridges, routers and other devices, according to a recent study.

Customers should expect to see some bargains between now and 1994, as prices fall anywhere from 8% to 42%, on average, for fiber-based internetwork products, according to Richard Mack, an analyst with Kessler Marketing Intelligence Corp. who authored "U.S. Markets for Fiberoptics in Point-to-Point Data Communications."

Mack said the rush to network personal computers within large corporations is forcing many users to find ways to link departmental local-area networks into a single, corporatewide network.

Growing numbers of users are opting to connect copper-based LANs with fiber-based internetwork products primarily because fiber is more reliable than its copper counterparts and, over the long haul, it can support greater amounts of bandwidth, he said.

Hot spots

The hottest selling fiber-based internetwork products will be bridges, routers and stand-alone LAN repeaters, he added. Sales of those products will rise by close to 50% annually through 1994, Mack said.

Consequently, prices of those products will drop considerably. For instance, while fiber-based bridges sold for about $9,000 last year, Mack projects they will cost only $5,200 on average by 1994.

"The low-end sector of the bridge market will likely see the most dramatic price shifts," Mack added.

Fiber-based routers will fall in price, although somewhat less. The survey estimates that fiber routers will cost $16,000 by 1994, just 8% less than the $17,500 for which they currently sell.

However, while the price of those components may not fall as dramatically as bridges, Mack said most router makers will add custom features to their products that previously were unavailable. Many will offer a broad mix of proprietary transport protocols as options, in addition to standard support for Open Systems Interconnection, Transmission Control Protocol/Internet Protocol and Network Basic I/O System protocols.

Other types of fiber-based data equipment will experience slower but steady sales growth in the early 1990s, the study said. The market for fiber channel extenders will grow 15% to 20% each year through 1994, pushing the market for these products to the $200 million level, the study said. However, prices for these products are not likely to shrink very much, Mack said.

By comparison, the market for fiber-based multiplexers is likely to grow by 20% annually during this period, but prices will also remain steady as manufacturers

(continued on page 10)

> Mack said most router makers will add custom features to their products.
>
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US West focusing on custom net services

With access-line growth falling off, RBHC turns to value-added features to boost net revenues.

By Bob Brown
Senior Editor

DENVER — Changing market conditions are forcing US West, Inc., one of the seven "Baby Bells," to grow up fast.

Unlike past years when the regional Bell holding company was content to peg revenue growth largely on the sale of local access lines, US West now is attempting to squeeze more revenue out of those lines by adding new features and generating custom services.

US West's Gary Ames

Factors that have caused the company to mature into an aggressive market-driven supplier include projected flat growth for the access-line market and the threat of alternative access carriers.

"US West's executives recognize that if they want to maintain a higher rate of growth in the telephone company business, they've got to not only sell more access lines, but get more revenue per access line," said Ronald Altman, chairman and chief executive officer of Altman Brenner Wasserman, a New York-based securities firm.

"Access-line growth won't accelerate beyond 3%, so they've got to focus on adding features and providing customized services," he said.

For users, US West's efforts will mean improved customer service, in addition to the rollout of advanced features and services, such as coordinated billing.

(continued on page 12)

INDUSTRY BRIEFS

Digital Equipment Corp. and **Andersen Consulting** last week announced an agreement to jointly pursue systems integration business across a broad range of industries.

The agreement provides for cooperative marketing, sales and service in the U.S., with both companies expected to subsequently team up internationally. The firms initially will target distributors of manufactured products, such as consumer goods and pharmaceuticals. Andersen Consulting offers industry expertise as well as software products. DEC can complement these offerings with application software, computers and network management skills, a DEC spokesman said.

DEC announced similar agreements with Arthur D. Little, Inc. and Computer Sciences Corp. in January.

The **Corporation for Open Systems (COS) International** recently announced an agreement to hand over further development of several Open Systems Interconnection conformance test tools to the U.K.-based **National Computing Centre, Ltd. (NCC).**

COS will pass over to NCC the development of the File Transfer, Access and Management (FTAM), Message Handling Service, Transport and Internet conformance test tools to be used to certify products under the COS Mark program. Until now, COS and NCC have been working together to develop initial versions of these conformance test tools.

The COS Mark program is a testing and licensing program designed to inform users that computer and communications products bearing the COS Mark have been tested to meet COS requirements, which are based on OSI standards.

(continued on page 10)

TOPS signs pact to extend reach of Network Bundle

By Walter Sweet
West Coast Correspondent

ALAMEDA, Calif. — The TOPS Division of Sun Microsystems, Inc. recently entered into an agreement with a local-area network adapter maker as part of an effort to increase its presence in the DOS workstation market.

The agreement with EMAC, a division of Everex Systems, Inc., certifies that TOPS' Network Bundle for DOS software, which includes file-sharing software integrated with electronic mail services, will work with EMAC Systems' SpeedTalk interface. SpeedTalk is an add-on board that lets IBM Personal Computers share files and peripherals with Apple Computer, Inc. Macintoshes on an AppleTalk net.

The announcement means that users that already use SpeedTalk will not be forced to buy TOPS' FlashCard adapter to run the Network Bundle for DOS.

According to TOPS President Richard Shapero, the EMAC alliance is the first of many such partnerships the company intends to form. TOPS said it hopes to leverage the popularity of its software in the Macintosh market into the DOS market through such agreements.

See the FAXNeT Form on Page #49

Prices spur demand for fiber

continued from page 9

will instead focus on delivering greater functionality for the buying dollar.

Mack said these companies will begin to build more modularity into their products, enabling users to buy only those functions they need. They will also build network management functionality as a standard component of all their products, he predicted.

The dark side of fiber

One interesting finding of the study is that the market for fiber cabling is growing at a faster clip than the market for interface equipment that supports fiber.

Mack said this is due to a large demand for "dark fiber," which is cabling installed for future use but not yet connected to an active network component.

Consequently, the demand for fiber as a transport medium will rise 20% to 30% over the next few years, the study said.

Industry Briefs

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The agreement also requires NCC to develop test tools that conform to European standards as well as to the COS Mark program. The contract also calls for NCC to migrate COS testers from their current Sun Microsystems, Inc. 3.5 workstation operating environment to the next generation 4.0 Sun system.

The COS Mark-quality test tools are scheduled for delivery to COS in June.

Telecom*USA, Inc., an Atlanta-based long-distance carrier, last week announced the formation of a new division dedicated to value-added telecommunications services, such as voice messaging and telemarketing.

The new Telecom*USA Enterprises division will include the following existing subsidiaries: Async Corp., a telephone voice messaging firm; Telecom Information Resources Co., which provides news, sports and other voice information services; Telecom*USA Direct, a telemarketing company; Telecommunications Services Co., which provides interconnect services in the Midwest; and Telecom*USA Publishing Co., which produces telephone directories.

Clark McLeod, vice-chairman, president and chief operating officer of Telecom*USA, Inc., will assume operating responsibility for the new division. Gene Gabbard, chairman and chief executive officer of Telecom*USA, Inc., will assume operating responsibility for the company's two divisions that provide long-distance service: the Central Division in Cedar Rapids, Iowa, and the Southern Division in Atlanta.

Moving a data center to the suburbs isn't as far out as you'd think.

There's growing interest in moving large data centers from expensive downtown offices into cheaper space a little farther out.

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US West focusing on net services

continued from page 9

"In the old days, the Bell system was organized around states and geography, but now US West is organized around customers," said Win Wade, president of both US West Information Technologies Group and US West Advanced Technologies, Inc.

For instance, the company is meeting monthly with customers and tailoring services to meet their needs. At the same time, it's also cutting layers of management and overhauling an internal computer and billing system to become more responsive to customers.

The carrier's most extensive effort to serve customers better is its massive "resystemization" effort to revamp computers and some 1,000 applications that support US West's internal operations.

The five-year project is expected to provide customers with faster response to service and repair requests, as well as more customized bills and services.

To do the job, the company is upping its investment in internal computer systems by about 15% to $2 billion a year, Wade said.

The largest component of this effort is a plan to consolidate the separate billing systems of its three former Bell operating companies into one, Wade said. This would enable customers served by several local telephone companies in the region to receive coordinated bills, he said.

The carrier is also looking to improve the options users have for receiving bills, including the increased use of electronic data interchange, he added.

US West has also initiated a series of monthly executive meetings at the sites of its large customers, said Gary Ames, president of US West Communications, Inc., US West's telephone operating company unit. The first such meeting was held at an AT&T site, and future possible sites include The Boeing Co. and the telecommunications department of any state in US West's 14-state region, he said.

The company also recently completed a survey of large users to find out what issues are most important to them. Users singled out disaster recovery services along with services such as Integrated Services Digital Network that help users better serve their customers, said Tom Pardun, vice-president and general manager for US West Communications' Large Business Services.

The carrier has already made strides in both areas, having rolled out a comprehensive set of recovery services that includes a heavy dose of consulting, as well as ISDN services in a number of cities, including Colorado Springs and Minneapolis.

Another item high on users' lists was network management, Pardun said. US West users can expect to see the carrier roll out net management offerings to help them gain more control of their networks later this year, he said. These products could be unveiled as early as the second quarter, sources said.

The company is also taking steps to assure customers that they can influence research and development. For instance, when US West opens a new R&D facility in Boulder, Colo., next year, users will be encouraged to share their views on product and service developments, Wade said.

Industry watchers credit US West's management team with having excellent focus on customer needs throughout all aspects of the business.

"They are probably the best pure marketers out of the seven RBHCs because they understand selling, marketing and customer relationships," Altman said.

A major self-improvement plan at US West is expected to benefit customers as much as the carrier itself, company executives said.

As of Feb. 28, the carrier trimmed its work force by nearly 4,000 managers as the result of an early retirement incentive program announced last year.

On the downside, the company lost some valuable employees. However, the program promises to speed decision making and enable the company to reallocate the payroll savings into such areas as product development, he said. The company also plans to hire back more than 800 employees in more customer service-focused jobs, he added.

Worth Noting

Deloitte & Touche, a management consulting company, recently awarded Octel Communications Corp. a $5 million contract to construct a nationwide voice mail network to serve more than 100 U.S. cities. Deloitte & Touche was formed in December 1989 by the merger of Deloitte Haskins & Sells and Touche Ross.

Carrier Watch

Southwestern Bell Telephone Co. last week began installing 168 miles of fiber it will use in its first interactive video network, which will link nine school districts in southwest Kansas.

Southwestern Bell and two independent telephone companies will help deliver two-way video instruction to students in the state's Ashland, Coldwater, Fowler, Greensburg, Haviland, Meade, Mullinville, Protection and Southwestern Heights school districts in August.

The independents, The Haviland Telephone Co. and United Telephone Association, will link the schools via fiber to the video network, according to Gil Gordon, video services manager for Southwestern Bell.

The network, dubbed the Advanced Plan for Linking Unified Schools (A-PLUS Network), will support multiple analog video channels and voice circuits. The network will enable students in classrooms miles apart to share an instructor and participate in calls by seeing and conversing with one another via television monitors in nine schools. Up to four schools will be able to transmit and receive video and audio simultaneously.

The A-PLUS Network per-

(continued on page 16)

LECs step up use of fiber as long haulers scale back

FCC study focuses on 1989 installation efforts.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Long-distance carriers significantly cut back on the amount of fiber-optic cable they installed in their networks last year, while local carriers accelerated the pace of fiber deployment, according to a report issued recently by the Federal Communications Commission.

The report found that long-distance carriers, as a group, installed about half as many miles of fiber last year as they did in 1988. Fiber installation rates fell from more than 27% two years ago to 15% last year.

However, during the same period, local carriers — regional Bell holding companies and major independent carriers — significantly increased the number of fiber miles in their networks. Installation rates for this group exceeded 30% in 1989. Alternative local carriers, many of which are in the start-up phase of their nets, were even more aggressive in installing fiber in 1989.

Rather than installing fiber cables last year, long-distance carriers generally concentrated more on optimizing previously deployed fiber, the FCC report said. Carriers began to equip unused "dark" fiber with the necessary electronics to bring it into service and upgrade existing fiber routes by installing new technologies to achieve higher bit rates.

AT&T, however, was a notable exception among the long-haul carriers. The carrier increased the number of fiber miles in its network by 35% last year, while installation rates for its two major competitors, US Sprint Communications Co. and MCI Communications Corp., were less than 5%.

AT&T was installing new fiber to handle the Federal Telecommunications System 2000 contract and also to generally upgrade its network.

US Sprint increased fiber installation by about 3%, and MCI increased installation by just over 1%.

The FCC report said that all the long-distance carriers combined have 2.1 million miles of fiber installed domestically, which represents an investment of about $6.15 billion.

Investment in undersea fiber cable last year was $1.5 billion, an increase of 50% from 1988, the report said. By 1996, some industry analysts project the figure will be more than $6 billion.

Local carriers installed fiber

(continued on page 60)

WASHINGTON UPDATE

BY ANITA TAFF

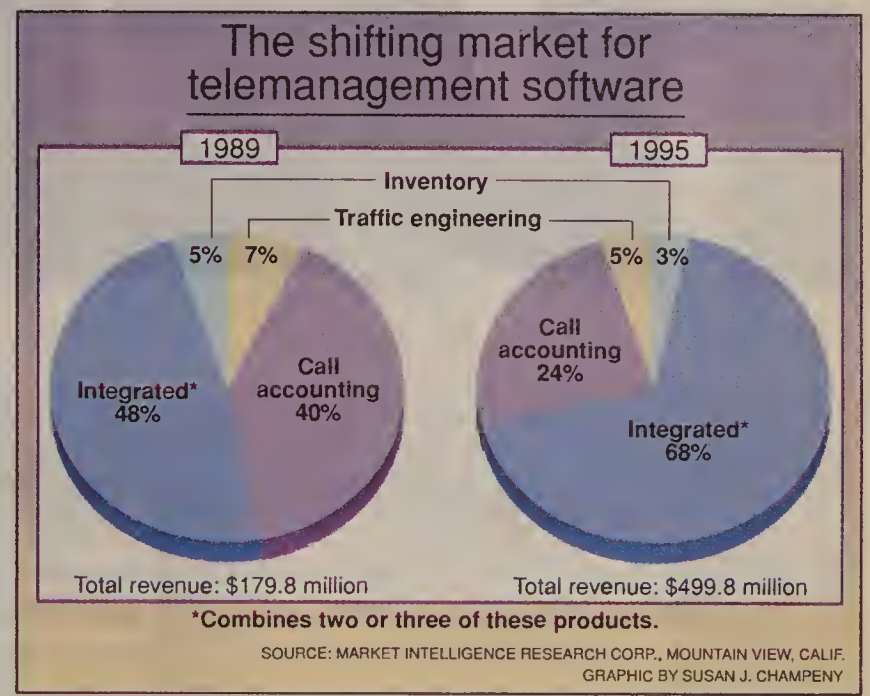
FTS 2000 weathers MCI protest. The General Services Administration withstood yet another challenge to the Federal Telecommunications System (FTS) 2000 contract when a protest from MCI Communications Corp. was rejected. MCI claimed that the GSA, which oversees the FTS 2000 contract, was seeking to bring new services under the contract without open bidding, an action that would violate federal law.

The dispute centered around the Internal Revenue Service, a user on US Sprint Communications Co.'s portion of the FTS 2000 network. The IRS maintains several 800 numbers to aid taxpayers. Although 800 service is specifically included in the FTS 2000 contract, several features that the IRS wanted to add — such as time-of-day routing, call distribution routing and call forwarding — were not described in the contract.

The GSA Board of Contract Appeals ruled that the management features are extensions of contract services and do not require open bidding. A provision of the FTS 2000 contract specifically allows vendors to add service improvements without a bidding process.

US Sprint applauded the decision, saying it would allow government users to continue receiving telecommunications services on a timely basis.

US Sprint officials had warned before the ruling that forcing the government to open every service enhancement to bids would destroy the intent of FTS 2000 — the efficient and rapid delivery of advanced services.



Multifunction mgmt. tools corner market

Integrated telemanagement systems flourishing at expense of single-function management tools.

By Bob Wallace
Senior Editor

MOUNTAIN VIEW, Calif. — With the emergence of integrated telemanagement systems, which combine call accounting, inventory control and other functions, single-function systems will eventually fall by the wayside, according to a recent report by Market Intelligence Research Corp., a consultancy here.

The 303-page study, "U.S. Telemanagement Systems, Software and Services Market," predicted that total sales of telemanagement offerings, including integrated products, will increase from $268.5 million in 1989 to $625.7 million in 1995.

The report divides telemanagement systems, software and services into four categories: call accounting, traffic engineering, inventory control and integrated packages.

Call accounting products help users perform cost accounting, billing functions and traffic analysis. Traffic engineering wares support network reconfiguration and optimization, while inventory control software enables users to track and manage equipment, lines and cable plant.

Sales of integrated software packages, which accounted for 48% of all telemanagement sales in 1989, will surge to 68% in 1995, while sales of call accounting software will slip from 40% reported last year to 24% in 1995, the report said. Traffic engineering and inventory control software sales are also expected to erode over the next five years.

Like single-function systems, integrated telemanagement software is available for personal computers, minicomputers and mainframes. Integrated telemanagement software typically consists of several modules, each supporting a specific function. A base system usually includes call accounting, traffic engineering and inventory control modules. Additional modules, for billing, cable plant management, and work and service order processing, can be bought separately.

The report said integrated offerings have become increasingly attractive for two reasons: Users prefer buying software from one vendor instead of multiple ven-

> Sales of call accounting software will slip from 40% last year to 24% in 1995.
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dors, and integrated packages use a common data base, which means that an update in one area changes data in all areas.

Integrated telemanagement software is flourishing at the expense of single-function call accounting and traffic management software. While sales of personal computer-based call accouting packages are growing steadily, sales of minicomputer- and mainframe-based software are slipping. The same holds true for traffic management software.

Sales of personal computer-based call accounting software

(continued on page 16)

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Telco Research's telemanagement system for colleges makes debut

By Bob Wallace
Senior Editor

NASHVILLE — Telco Research Corp., a network design and management firm based here, recently announced Student Resale Manager, a comprehensive telemanagement system for colleges and universities.

The software, which runs on Digital Equipment Corp. VAX and MicroVAX minicomputers under VMS and IBM mainframes under MVS, enables managers to track, manage and bill student calling costs.

Student Resale Manager was created in part by Harold Sloss, director of Student Resale development for Telco Research and former telecommunications manager at Middle Tennessee State University in Murfreesboro.

Telco Research said roughly 1,700 U.S. colleges and universities can use the new software. "We spent over a year collecting input from telecom managers at colleges and universities and analyzing their RFPs to understand their needs," Sloss said.

Student Resale Manager works as an adjunct to Telco Research's CCO System Cost Allocation Manager and can be integrated with CCO's Network Efficiency Manager, Directory Services, Telecom Manager and Problem Recovery modules.

Sloss said Student Resale Manager works with most major private branch exchanges and Centrex. In VAX environments, the switches will typically pass call detail information over an RS-232 link. In an IBM environment, an IBM Personal Computer polls call data from the switches and uses microcomputer-to-mainframe software to pass the information to the mainframe for processing.

Users can access processed data on-line using an RS-232-attached terminal. The system can be programmed to generate daily or weekly reports, and detailed student telephone bills.

Student Resale Manager produces a variety of reports including:

- **Daily Notification Report** containing a list of students who exceed their credit limits. Universities typically give these students a grace period to make payment before service is cut off.
- **Daily Deny Service Report** identifies all students whose accounts remain unpaid and is used to issue work orders to stop service.

Student Resale Manager continues to monitor the state and activity of those accounts even after service is disconnected.

- **Daily Restore Service Report** is a list of students who need service restored and is used as a basis for issuing work orders.
- **Daily Transaction Journal** gives the beginning balance, usage charges, other charges, payments, other credits and ending balance for each student account. A usage charge summary showing the number of calls made, total duration and total charges is also included.
- **Daily Cash Receipts Journal** shows payments made each day and balances these figures against actual cash receipts. This report lists each student by number, a reference number, such as the check number, the amount of the payment and a grand total of all payments for that day.
- **Daily Other Charge and Credit Journal** shows other charges and credits posted that day in student-number sequence. The report lists account charges and credits, individual charges and credits, and the day's total of charges and credits.

Student Resale Manager also generates monthly reports including:

- **Monthly Account Aging Journal** lists, by student number, all accounts that have outstanding balances for at least 30 days, with a breakdown by balance past due, current balance, and 30-day, 60-day and 90-day balances.
- **Monthly Student Resale Bill** contains student information, billing date, call details for billing period, charges and credits, payments made during billing period and the amount due.

Student Resale Manager is available now and ranges in price from $22,000 for a MicroVAX 3100 to $49,000 for an IBM 3090 or 4381 mainframe. When purchased as part of Cost Allocation Manager, pricing ranges from $37,700 for a MicroVAX 3100 to $84,000 for an IBM 3090 or 4381. The five-module CCO System with Student Resale Manager running on a MicroVAX 3100 costs $118,000, while the same system for an IBM 3090 or 4381 mainframe is priced at $189,000.

These prices include one year of maintenance and system enhancements, as well as installation and training, according to the vendor.

Telco Research can be reached by writing to 1207 17th Ave., S. Nashville, Tenn. 37212, or by calling (615) 329-0031.

> "We spent over a year collecting input from telecom managers at colleges and universities and analyzing their RFPs to understand their needs," according to Harold Sloss, director of development for Student Resale Manager.
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Multifunction mgmt. tools corner market

continued from page 13

are accounting for an increasing share of total call accounting software sales. Personal computer-based systems, which pulled in 48% of total sales last year, are expected to net 50.2% this year and edge ahead to 55.4% in 1995, the report said.

Meanwhile, revenues from minicomputer- and mainframe-based call accounting systems are slipping, dropping from a total of 52% last year to an estimated 49.8% this year and 44.6% in 1995.

Minicomputer- and mainframe-based inventory control software is accounting for a slowly increasing portion of total sales of inventory control products. Minicomputer- and mainframe-based systems, which accounted for 72.6% of all inventory products sold last year, should push forward to 72.5% this year and 74.5% in 1995, the report said.

On the personal computer side, sales of inventory control products are expected to increase from 27.4% last year to 27.5% this year, slipping to 25.5% in 1995.

The telemanagement software market dwarfs the telemanagement services market. While sales of telemanagement software are expected to soar, sales of telemanagement services will increase at a moderate pace. Users spent $68 million on telemanagement services last year and will spend $107.7 million in 1995, according to the report.

Integration will play a major role in the future of the telemanagement service market as well. Users want a service bureau that can offer traffic engineering and inventory control services, the report said.

In 1988, revenues from call accounting services accounted for half of all telemanagement service revenues. Last year, revenues for integrated services overtook those from call accounting.

Carrier Watch

continued from page 13

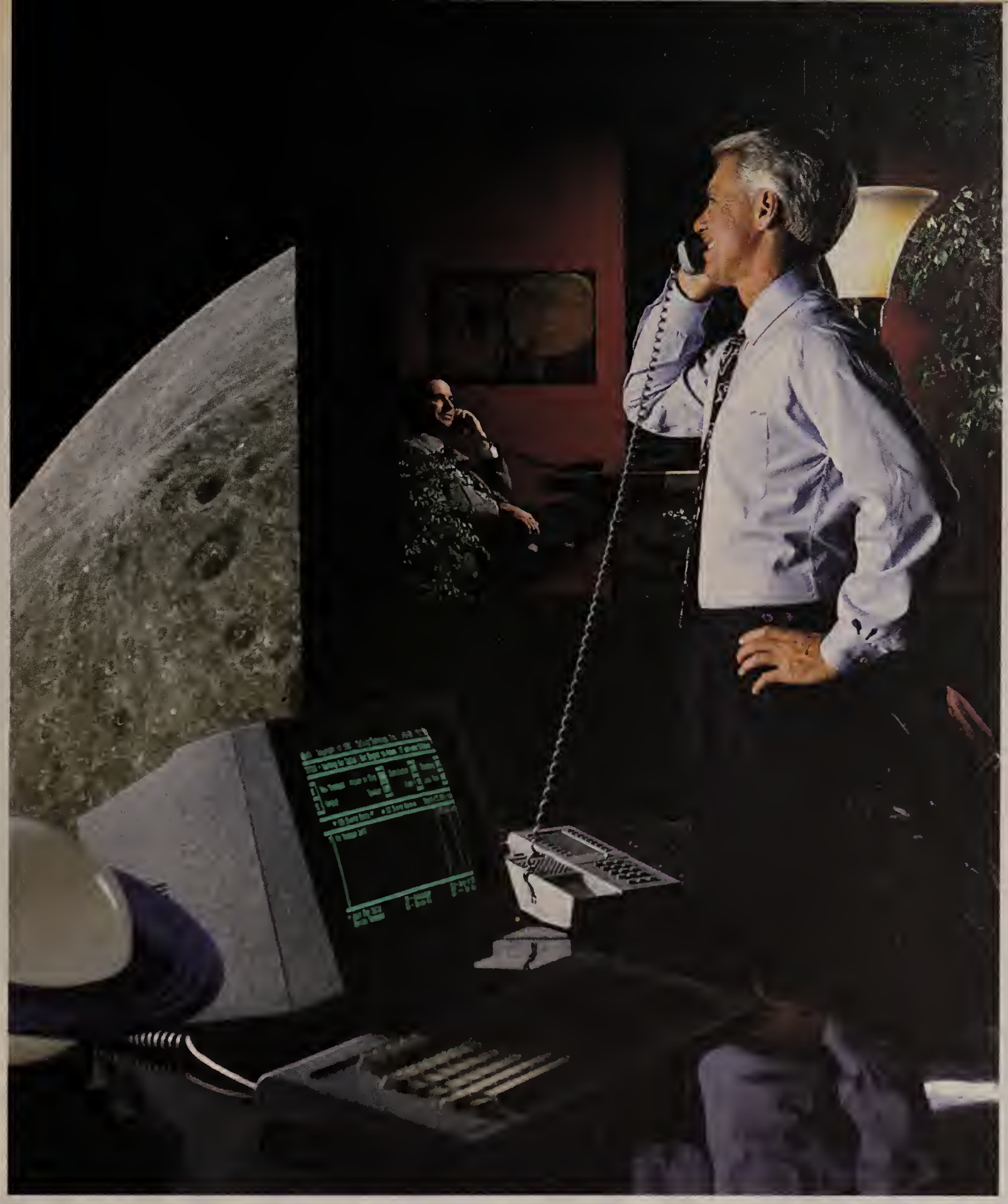
mits schools to share limited resources, provide staff training and link with other regional higher educational institutions.

Initially, the video net will be used to teach high school courses in the nine school districts.

Williams Telecommunications Group, Inc. (WTG) has installed three new DS3 digital monitoring systems in its 11,000-mile, nationwide fiber and digital microwave private-line network.

The **3M Dynatel System Division VenCAT brand 3100** monitoring systems will enable WTG to better monitor performance of DS3 links. The new systems are located at the carrier's Atlanta, Raleigh, N.C., and Washington, D.C. points of presence.

Each VenCAT system can monitor performance of up to 36 DS3 circuits without taking the lines out of service. WTG technicians program the monitoring systems to generate alarms when circuit quality falls below preset thresholds. Seven-day and 24-hour performance data is stored in the unit for use in historical reports, according to 3M Dynatel. DS3 45M bit/sec service provides the equivalent of 28 DS1 1.544M bit/sec channels or 672 DS0 64K bit/sec channels over a single line. The high-speed service supports full-duplex synchronous and asynchronous transmission of digital signals.



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Worth Noting

"OSI is here today, but it is not being fully implemented. It's being implemented in very small pieces."

Kenneth Brantley
Director
Product management
NCR Comten
St. Paul, Minn.

Data Packets

AT&T this week is expected to announce it will market its Accumaster Integrator network management software internationally.

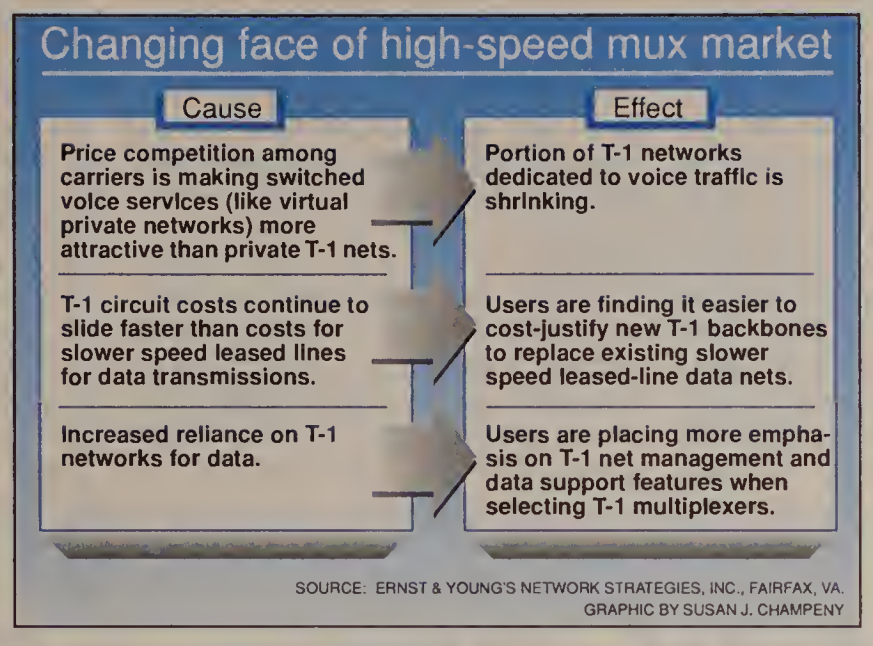
AT&T has thus far limited sales of its integrated network management software to the U.S. However, demands from U.S. users with offices overseas are forcing AT&T to make the software, which runs on a 3B2 minicomputer, available worldwide.

Accumaster Integrator receives network management data from vendor-proprietary management systems used to control such devices as modems, multiplexers and private branch exchanges. The software combines information from the systems into a single network map that is displayed to users on an attached Sun Microsystems, Inc. workstation.

Siemens Information Systems, Inc. of Boca Raton, Fla., last week unveiled software for Unisys Corp. 1100 and 2200 series mainframes that enables them to access Siemens nonimpact printers.

The Spin-X software, developed by the Georgia State University Foundation, lets Unisys mainframes download data to Siemens 2200-2 and 2300-2 Laser Printing Systems and the 2050 LED Printing System.

The software lets a Unisys host operate a Siemens printer over a block multiplexer channel as though it were a standard Unisys printer. Available now, Spin-X costs about $12,000, depending on system configuration.



Study finds users asking more of T-1 multiplexers

Increased data traffic boosts demand for features.

By Jim Brown
Senior Editor

FAIRFAX, Va. — Responding to the increase of data traffic on their T-1 nets, many users are demanding — and getting — new features from multiplexer makers, according to a recent report.

The report, published by Network Strategies, Inc., a network consulting practice of Ernst & Young, based here, found that users are increasingly requiring T-1 multiplexer vendors to bolster network management, support fractional T-1 services, provide better alternative routing and ensure that existing T-1 multiplexers can be upgraded to support T-3 circuits.

These capabilities contrast with such features as voice compression algorithms, which were in demand just a few years ago. Voice compression, for instance, doubled the amount of voice calls a T-1 line could support from 24 to 48.

Demand for these new data capabilities underscores a shift in the traffic users send over their private T-1 nets, according to James Harrison, an analyst with Network Strategies. The split between voice and data on T-1 networks is shifting from roughly 70% voice and 30% data to about half voice and half data, he said.

"Five or six years ago, T-1 networks were being designed and built primarily to support voice traffic," Harrison said. "What is distinguishing one vendor from another today is their ability to provide data functionality."

Data features inherent in T-1 multiplexers are becoming more important as users divert voice traffic from private T-1 backbones in favor of switched services such as virtual private networks, which have been drastically falling in price.

This is coupled with the fact that users are finding it easier to cost-justify T-1 networks as replacements for slower speed leased-line data nets because leased-line prices are generally higher than T-1 circuit costs and have not fallen as dramatically as switched services.

Users are also seeking strong data networking features simply because they are transmitting more data between sites and are beginning to interconnect local-area networks over T-1 backbones, the study said.

New mux needs

- Alternate routing
- Support for:
  - — Fractional T-1
  - — LAN interconnection
  - — T-3 ties
- Single-product architecture

Fractional T-1 services, which enable users to lease portions of T-1 circuits, are also making it possible for users to link sites to a T-1 network that previously did not have enough traffic to justify a full T-1 circuit.

As users entrust more data to their T-1 backbones, network management is becoming a requirement, the study said. "A few years ago, users could accept a few network failures because it was primarily voice traffic and it was not as crucial an issue as it is now that their mission-critical data traffic is being passed over the network," Harrison said.

This means vendors will also have to provide better alternative routing features on their T-1 multiplexers, said Joseph Gottlieb, an analyst with Network Strategies. "On a voice backbone, you can often reroute traffic onto the public switched network in case of a

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IBM explains role of new OSI subsystem

OSI/Communications Subsystem enables users to build applications, communicate with other hosts.

By Paul Desmond
Senior Writer

PALO ALTO, Calif. — IBM's OSI/Communications Subsystem, due out this month, promises to be the foundation upon which all future IBM Open Systems Interconnection products will be built and a base on which users can build their own OSI applications.

IBM executives here, where the product is currently being tested, took time out recently to detail for *Network World* exactly what OSI/Communications Subsystem is and what it will allow users to do.

The product is mainframe software that lets IBM-based OSI applications communicate with OSI applications on other vendors' machines, said Erv Wittman, manager of IBM's development programming center here.

OSI/Communications Subsystem is similar to VTAM in that it supplies the middle layers that link applications to transport mechanisms, said Jerry Mouton, chief architect for OSI/Communications Subsystem.

"If you look at VTAM, it [provides] what it takes to get from the application down to the support layer that gets you out on a line," Mouton said. "OSI/Communications Subsystem does the same thing. It provides a similar analogous set of layers."

Wittman said OSI/Communications Subsystem is more than the gateway it is often described

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Service eases user's move from Unisys to IBM host

By Jim Brown
Senior Editor

HARTFORD, Conn. — Advo Systems, Inc. last week said a protocol conversion service offered by BT Tymnet, Inc. is easing its migration from a Unisys Corp. mainframe to an IBM host.

BT Tymnet's Character Mode Translator (CMT) service enables personal computers in Advo's 30 remote sales offices to dial into a data center here via BT Tymnet's X.25 public packet network, as well as to transmit orders to a Unisys mainframe and accounting data to an IBM host.

This obviates the need for separate Unisys and IBM terminals in each sales office or for the direct mail advertiser to outfit each personal computer with terminal-emulation software for each host. Eventually, the Unisys host will be phased out and remote sites will upload data to the IBM host.

Advo is migrating to an IBM host as part of a larger effort to build a Systems Network Architecture-based network that will link IBM Application System/400 minicomputers in 20 regional sites to the data center here. The sales offices, however, do not generate enough traffic to be included in that network.

Instead, when orders must be entered onto the Unisys host, personal computer users dial into the nearest BT Tymnet X.25 switch using asynchronous communications software. That switch converts the asynchronous data to X.25 packets that are routed to the BT Tymnet switch attached to the Unisys host at the data center. The BT Tymnet switch then converts the X.25 packets to a data stream supporting Unisys' Universal Terminal System protocol, and the data is routed to the Unisys host.

The process for reaching the IBM host is similar except that X.25 packets are converted to Synchronous Data Link Control format by software running on the BT Tymnet switch attached to the IBM host.

"From a single PC, we are able to access both of our environments, which is helping us tremendously during the migration," said Robert Fluegel, director of telecommunications systems and planning at Advo.

The company has been using the CMT service to enter orders on the Unisys host since late 1987. Last year, when it started migrating order tracking and other applications from the Unisys host to the IBM mainframe, use of the CMT service was expanded to support IBM host access.

"There weren't any other value-added network vendors out there that were willing to accommodate both of our environments," Fluegel said.

IBM explains role of new OSI subsystem

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as. The product provides Layers 3 through 6 of the OSI stack and has Application Program Interfaces (API) that provide access from those layers to OSI application-layer services. It runs on top of front-end processor-based software that provides access to the lower two OSI layers.

He also stressed that OSI/Communications Subsystem is not a stopgap measure developed by IBM to give lip service to OSI. Rather, it is a strategic product that IBM has spent years developing and plans to continually enhance as OSI applications continue to take shape.

"It's a full-function IBM Cadillac implementation of OSI — the best that we can think of," Wittman said. "It serves as the base for current and future Layer 7 OSI applications."

IBM is supporting a full slate of OSI services at each layer, he said. For example, at the transport layer, OSI/Communications Subsystem supports transport Class 0, 2 and 4, each of which provides a different level of data integrity, allowing users to choose the appropriate level, depending on factors such as network reliability.

That is the chief difference between OSI/Communications Subsystem and previous OSI products from IBM, such as the IBM Open Systems Message Exchange (OSME), an X.400-based electronic mail package. IBM has said all along that OSME was merely an interim product, based on early OSI standards that offered only a subset of the features available today.

"The international standards community has progressed and done a lot of work in the last few years and so have we," Wittman said. "We included that [work] in OSI/Communications Subsystem."

To use OSI/Communications Subsystem, users need IBM's Network Control Program (NCP) Packet-Switching Interface (NPSI) running on their front-end processor to support X.25 links into the front end.

For VM hosts, an alternative to NPSI is the 43XX Integrated Communications Adapter, which acts as a communications controller for the smaller 43XX mainframes and supports X.25 links. Either product gives OSI/Communications Subsystem access to the OSI physical and data-link layers.

OSI/Communications Subsystem will initially be offered only for MVS and VM hosts. IBM has announced a statement of direction to provide similar or identical products that run under OS/2 and OS/400, which is the operating system for the Application System/400 minicomputer, Wittman said.

Initially, the only OSI application IBM will sell that works with OSI/Communications Subsystem is OSI/File Services, which is IBM's implementation of the OSI File Transfer, Access and Management (FTAM) protocol.

IBM has also announced its intention to provide X.400-based E-mail products on top of OSI/Communications Subsystem, along with interfaces that will link existing Systems Network Architecture E-mail and office automation products to the new X.400 offerings, Mouton said.

In addition, OSI/Communications Subsystem comes with APIs and application development tools that let users turn existing SNA applications into OSI applications, Wittman said.

> "It's a full-function IBM Cadillac implementation of OSI — the best that we can think of," Wittman said.
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IBM provides an OSI Abstract Syntax Notation One (ASN.1) conversion tool, which allows a user to write a program in COBOL or C and, when the data is passed through OSI/Communications Subsystem, it will be converted into ASN.1.

ASN.1, also known as ISO 8824, is an international standard data format. Another standard, ISO 8825, describes how to transform data into the ASN.1 format.

"We give you the APIs, and you can write a COBOL application or an application in C to do whatever you like," Wittman said. "You don't have to use a predefined OSI Layer 7 application," such as FTAM or X.400.

One beta user of OSI/Communication Subsystem, which Wittman declined to name, used the IBM-supplied APIs to write an application that makes it possible to ship transaction data between CICS applications running on multiple dispersed mainframes and a non-IBM mainframe at company headquarters, he said.

OSI/Communications Subsystem will also allow NetView to collect alerts from and have control over networked OSI entities.

"We provide an interface into the Command Facility of NetView and into the Network Problem Determination Aid of NetView," Mouton said. "That allows a user to issue commands to OSI entities out in his network, and it also allows him to collect alerts that have been generated by OSI entities."

Wittman said users can expect to see IBM build more features on top of OSI/Communications Subsystem.

"We will be building on this product for many years to come," he said. "This is the first international, fully supported [OSI] program product from IBM, and there's much more to come in 1990."

Worth Noting

"Two years ago, DEC's PC LAN strategy was, 'It's our VMS servers or nothing.' Now DEC realizes that to satisfy users, it has to support the major network operating systems. You can bet support for Portable NetWare will be next."

Bill Redman
Program director
LAN communications service
Gartner Group, Inc.
Stamford, Conn.

Netnotes

Meridian Technology Corp. recently announced that it has entered into an agreement with Digital Equipment Corp. aimed at quickening the adoption of DEC's Local-Area Transport (LAT) protocol as the primary method for connecting workstations to host computers on a local-area network.

LAT support would enable DOS-based microcomputers to access DEC VAX/VMS hosts as LAT-based terminals. Under the agreement, Meridian is authorized to grant LAT technology licenses to third parties, and DEC has licensed Meridian's SuperLAT software.

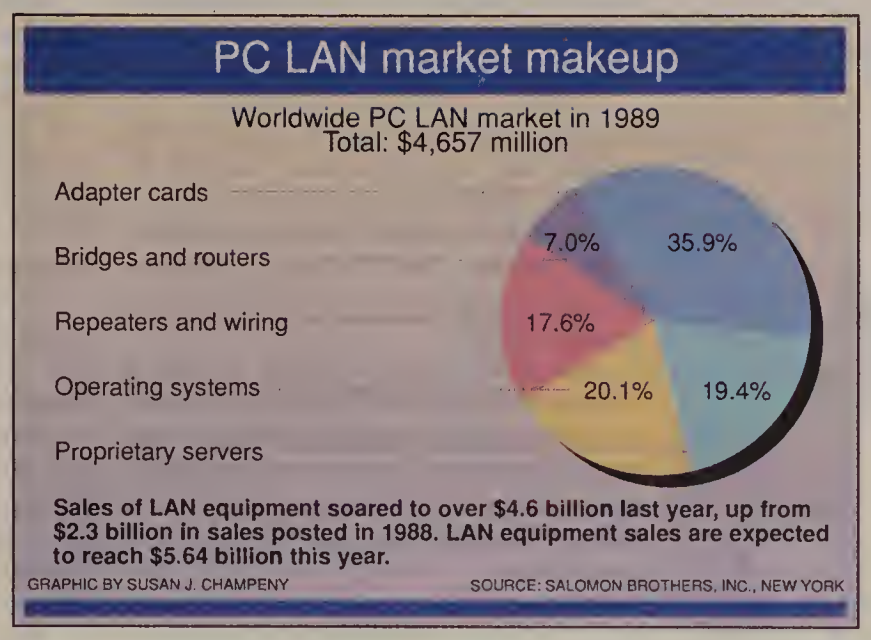
The two companies will also work together by exchanging technology, services and jointly marketing products to promote LAT.

Meridian Technology Corp., P.O. Box 2000, St. Louis, Mo. 68011; (314) 394-1600.

Datapoint Corp. last week announced that it will begin shipping its 20M bit/sec Arcnetplus development kits to developers on March 19.

The high-speed Arcnetplus offers as much as six times the throughput of 2.5M bit/sec Arcnet technology, but users will be able to install Arcnetplus on existing Arcnet nets.

Datapoint Corp., 9725 Datapoint Drive, San Antonio, Texas 78229; (800) 733-1500.



Helix offering helps users solve RAM-cram problems

NetRoom lets users manage system memory.

By Susan Breidenbach
West Coast Bureau Chief

BRIARWOOD, N.Y. — Helix Software Co. recently released a memory management product that helps alleviate the "RAM-cram" problems many LAN users encounter when trying to fit both applications and net software into the 640K bytes of traditional DOS random-access memory.

Called NetRoom, the product can be used to move network shells and device drivers into specified portions of expanded or extended memory. According to Helix Software, it uses up a maximum of 10K bytes of conventional DOS memory.

NetRoom lets users choose which LAN software to free up and where above the 640K-byte barrier to put it. Two of the options are high DOS memory between 640K and 1M byte, and the 64K-byte high memory area above 1M byte.

> "No one else provides LIM 3.2 Page Frame support," Spilo said.
>
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> NetRoom lets users choose which LAN software to free up and where to put it.
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A third option enables users to swap network software to the Page Frame in Version 3.2 of the Lotus Development Corp./Intel Corp./Microsoft Corp. Expanded Memory Specification (LIM EMS), mapping device drivers in and out of expanded memory on demand.

According to Michael Spilo, president and founder of Helix Software, this particular feature is one that makes NetRoom unique among products aimed at providing RAM-cram relief. "No one else provides LIM 3.2 Page Frame support," Spilo said.

NetRoom is not specific to any particular network operating system and has been certified as compatible with Novell, Inc.'s NetWare (including NetWare 386) and IBM's PC LAN Program. Testing with other network operating systems is currently under way, the company said.

It supports both LIM EMS 3.2 expanded memory and LIM 4.0 extended memory and, unlike some competing products, does not require extended memory to operate.

The software can also be used on lower end personal computers based on Intel Corp. 8088 and 8086 processors, not just AT-class systems.

To buy NetRoom, users must purchase a server license for $595, plus a LAN Workstation Package. The latter is available in a four-user version for $149 or a 10-user version for $249. A single-user evaluation copy, which includes a full working version of NetRoom, is being offered for $30.

For more information, contact Helix Software at 83-65 Daniels St., Briarwood, N.Y. 11435, or call (800) 451-0551.

Compaq stakes new claim in local nets

New LAN strategy based on strength in hardware, cooperation with leaders in network software.

By Laura DiDio
Senior Editor

HOUSTON — Compaq Computer Corp.'s years of sitting on the sidelines of the local-area network market are over.

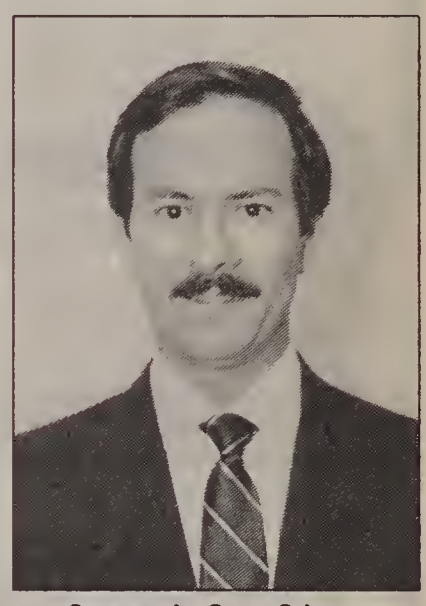
In the past four months, Compaq has burst onto the LAN scene by announcing its first line of servers, an OEM LAN Manager agreement with Microsoft Corp. and a technology development pact with Novell, Inc.

Before mounting this effort, Compaq's LAN presence was mostly accidental. Compaq's 386 Deskpro microcomputer has long been among users' favorite LAN server platforms, but the company did little to promote the Deskpro as a server or itself as a LAN vendor.

"Compaq has had a pattern of backdoor successes in the LAN industry based on the popularity of the Deskpro and the fact that the company enjoys good relationships with a lot of retailers and distributors who sell heavily into the networking market," said Doug Gold, manager of communications industry research at International Data Corp. (IDC) in Framingham, Mass.

The keystone to Compaq's new proactive LAN strategy is the SystemPro line of superservers introduced last November.

The SystemPro is based on the Extended Industry Standard Architecture (EISA) bus, is driven by a 33-MHz Intel Corp. 80386 microprocessor and can accommodate a second 80386 card. The servers support mainframe-type mass storage and large amounts of system memory.



Compaq's Gary Stimac

Industry analysts have observed that Compaq's decision to

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Proteon wins subcontract to provide gear for SABRE

By Laura DiDio
and Walter Sweet
Network World Staff

WESTBOROUGH, Mass. — Proteon, Inc. was recently awarded the subcontract to supply AT&T with token-ring network products as part of the carrier's deal to provide new workstations and network components for American Airlines, Inc.'s SABRE reservation system.

The American Airlines SABRE contract — the largest commercial computer product deal in AT&T's history — is worth between $100 million and $250 million, depending on the final configuration.

While Proteon officials declined to divulge the exact worth of its token-ring subcontract, sources close to the company said the deal could net Proteon as much as $25 million.

Proteon's token-ring products will be used in American Airlines' SABRE reservation network in more than 100 countries worldwide. The SABRE network is used by travel agents, airline agents and ticket agents to provide travel information to passengers.

Proteon's contract with AT&T calls for the company to provide its ProNET-4 products, which are compatible with IBM's Token Passing-Ring networks and the IEEE 802.5 standard for token-ring local-area networks. The products include adapter cards that support unshielded twisted-pair wiring, intelligent wire centers, and integrated net management software, according to Patrick Courtin, Proteon's president.

The Proteon token-ring nets will support about 50,000 AT&T 6386 WorkGroup Systems workstations.

AT&T and Proteon officials said that such a large order is a

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Compaq stakes new claim in local nets

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base the SystemPro on EISA distinguishes the device from other superservers such as NetFrame Systems, Inc.'s NetFrame.

NetFrame offers mainframe-type I/O but employs a proprietary hardware architecture that requires special versions of Novell's NetWare and Microsoft Corp.'s LAN Manager network operating systems.

By contrast, the Compaq SystemPro can run standard network operating system software.

According to Gary Stimac, Compaq's senior vice-president of systems engineering, the company will work with the major network operating system vendors to optimize their products to run on the AT-class Deskpro 80386-based machines and the SystemPro.

"Rather than compete with the software vendors, we'll work with them to develop win-win situations for all concerned," Stimac said.

Stimac said he believes that Compaq's message of network operating system neutrality may have been missed in the ballyhoo surrounding its decision to resell Microsoft and 3Com Corp.'s OS/2 LAN Manager for the SystemPro.

"Our decision [to license LAN Manager] was a coup from Microsoft's standpoint," Stimac said, "in that we're a large company and we took a great deal of pains to develop a value-added OEM version of LAN Manager. But we want to make it clear that our arrangement with Microsoft is by no means exclusive. Our developmental relationships with other vendors are equally important."

Stimac said Compaq chose to develop its own version of LAN Manager rather than purchase an OEM version from IBM or 3Com "because IBM and 3Com are both competitors and we couldn't see them engineering their core LAN operating system products to benefit our SystemPro."

While Compaq is a committed LAN Manager OEM, Stimac emphasized that the SystemPro will also run Novell's NetWare and The Santa Cruz Operation, Inc.'s Unix/386, ("Compaq enters LAN arena with servers," *NW,* Nov. 13).

"We'll support the industry-standard versions on our hardware, and users can choose whatever network operating system works best for them," Stimac said.

Compaq's LAN strategy got another boost last month when it entered into a joint development agreement with Novell to increase the level of system fault tolerance (SFT) available in microcomputer-based network file servers ("Novell, Compaq join forces to boost SFT in file servers," *NW,* Feb. 12).

The two companies will combine the technology in Novell's as yet unreleased SFT III for NetWare with the multiprocessor architecture of SystemPro.

Compaq and Novell will develop both hardware and software extensions that will support mirrored servers in the NetWare 386 environment. Mirrored servers will provide complete server redundancy and will virtually guarantee 100% network uptime, analysts predicted.

Compaq ranked No. 1

Compaq's LAN initiatives are almost assured of garnering acceptance thanks to the reputation Compaq already enjoys among users and distributors.

Compaq machines were ranked No. 1 last November in overall satisfaction in a survey of more than 200 U.S.-based computer specialty stores by Computer Intelligence, a market research firm in La Jolla, Calif.

The stores gave Compaq higher marks for product reliability, pricing, and service and support than IBM, Hewlett-Packard Co., AT&T and Apple Computer, Inc., among others.

Statistics supplied by IDC show the 386-based Compaq Deskpro is, along with IBM's 386-based Personal Computer AT, users' favorite choice for a personal computer LAN server.

"In 1989, four out of five LAN servers were dedicated PC AT machines; of that number, about 30% were Compaq Deskpros," IDC's Gold said.

But Compaq's formula for success in the LAN market also depends in part on what the company won't do, Stimac said.

Compaq will not develop its own LAN operating system software because of the resources required. The company actually started to develop its own network operating system in 1987 but abandoned the effort when it realized it would be such a resource drain. "Rather than compete with the software vendors, we'll work with them to develop win-win situations for all concerned," Stimac said.

Direct sales to end users are also not in Compaq's future.

"Our plan is to continue to sell through our distributor and [value-added reseller] channels," Stimac said. "However, we realize that our product line is becoming more complex, and therefore, we have to increase the level of support and installation and maintenance documentation to our dealers. In essence, we have to make installation and service [of Compaq systems] idiot-proof to our channels."

Why not sell directly to end users? "It's pure economics," Stimac said. "Direct sales mean adding thousands of sales, service and support personnel to our payroll. The overhead would be staggering."

Proteon wins contract to provide gear

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vote of confidence for token-ring technology and its users.

"The thing that is interesting is the fact that AT&T, which is primarily known for its Ethernet networks, was chosen over IBM, which is the dominant token-ring network supplier with over 90% market share," Courtin said.

AT&T chose Proteon because its token-ring offerings are both IEEE 802.5- and IBM-compatible. Additionally, AT&T was impressed with "Proteon's intelligent wire centers, which feature superior network management capabilities," said Scott Perry, AT&T's marketing and support vice-president.

Unlike IBM Token-Ring components, Proteon's media access units and intelligent wire centers enable the network administrator to locate, isolate and disable any faulty nodes from a central network management console, Perry noted.

Both companies hinted that they have similar projects in the works with other airline companies but declined to discuss them more specifically.

American Airlines' current contract for 50,000 nodes could increase as more travel agents establish links to the network, an AT&T spokesman said.

Worth Noting

"The biggest obstacle in the development of [Health Level 7] is people waiting on the sidelines to see it happen. These people must get involved to ensure that the standard is suitably robust for all transactions."

Robert Pickton
Vice-president of management systems
The Moses H. Cone Memorial Hospital
Greensboro, N.C.

Association Watch

There was a host of releases last week from the **National Automated Clearing House Association (NACHA),** including the announcement of two conferences and an expansion of the membership base in its **Banker's Electronic Data Interchange Council (BEDIC).**

In addition to accepting depository financial institutions, NACHA's BEDIC has broadened its membership base to include national trade associations and companies interested in EDI in the banking industry.

For a $500 annual fee, associate members will receive subscriptions to all written materials produced by BEDIC.

NACHA 90, the organization's annual conference, will focus on EDI in more than a dozen sessions held April 29 to May 2 in Washington, D.C. The cost of the conference is $625 for members and $725 for nonmembers.

Also, NACHA's annual **Payments Institute** was announced for June 24 to 29 in Boulder, Colo.

The Payments Institute costs $895 for members and $1,095 for nonmembers and includes housing and meals.

For additional information on any NACHA activity, call (703) 742-9190.

Managers use many tactics to locate top net prospects

Headhunters, tapping contacts top techniques.

By Wayne Eckerson
Senior Writer

Hiring qualified network personnel is not an easy task given the shortage of well-trained network professionals in today's labor market.

Most network managers resort to a range of hiring techniques to search for qualified candidates, but large companies usually wind up tapping local headhunters to fill their needs.

Headhunters aren't always the best method to identify likely job candidates, however, network managers said last week. Many companies also parlay personal contacts in the industry to spread the word; advertise in trade journals, local papers and alumni newsletters; attend job fairs and conferences; and contact professional associations.

"We try all avenues," said Chuck McCaig, senior vice-president of corporate services at Mutual Benefit Life Insurance Co. in Newark, N.J.

McCaig, who presides over a staff of 600 information systems and network professionals, says the normal turnover rate for his group is about 9%, or about 54 people each year. "We're always looking for people," he said.

Because of the number of positions the division must fill each year, McCaig relies heavily on headhunters to provide qualified candidates. This is especially true for network and telecommunications professionals because they are the most difficult to find, he explained.

McCaig said headhunters who specialize in telecommunications or data processing can be effective because they have data bases of 12,000 or more active technical professionals of all backgrounds and skill levels. The headhunters can search their data bases and quickly find one or two qualified candidates. McCaig said it might take him and his supervisors much longer to produce similarly qualified people through their own network channels.

McCaig also said headhunters are good at doing some sales work to persuade network professionals who are otherwise content in their jobs to consider a

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BOOK REVIEW

BY ERIC SCHMALL

Telecom dictionary fills void in industry

Newton's Telecom Dictionary (New York: The Telecom Library), $19.95.

No industry needs a comprehensive dictionary more than the telecommunications business. *Newton's Telecom Dictionary* goes a long way toward filling that need.

The reference work contains several thousand entries and presents a remarkably clear and wide range of simple definitions of esoteric telecommunications terms. While this edition has some substantial drawbacks, its overall contribution to the field of technical literature is very positive.

Readers will find the book helpful because it often goes on for more than a page to describe particularly complex concepts such as Integrated Services Digital Networks, Signaling System 7, queuing and X.25. Other terms, such as acronyms, take only a few lines of description.

The book's greatest strength is its clear and friendly explanation of terms. In each entry, it speaks to the reader in a chatty, informal tone. For instance, the term "blocking" (whose definition is a page and a half long) is described as "a fancy way to say the caller is receiving a busy signal." It then goes on to discuss the various aspects of blocked calls, the concept of grade of service and other key issues.

Another significant strength to be found in this work lies in

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Schmall is a network systems manager for an insurance holding company.

MANAGEMENT PROFILE

WORLDSPAN Travel Agency Information Services will combine applications from Delta Air Lines, Inc.'s Datas II net and Northwest Airlines, Inc. and Trans World Airlines, Inc.'s PARS net.

SOURCE: WORLDSPAN TRAVEL AGENCY INFORMATION SERVICES, ATLANTA
GRAPHIC BY SUSAN J. CHAMPENY

Execs plot course for reservation net

By Joe Panepinto
Staff Writer

KANSAS CITY, Mo. — Overseeing the creation of a single airline reservation service from the merger of two separate networks serving almost 50,000 travel agents worldwide is a monumental managerial task.

But officials at newly formed WORLDSPAN Travel Agency Information Services say they are up to the challenge.

WORLDSPAN was formed last month by Delta Air Lines, Inc. and PARS reservation network owners Trans World Airlines, Inc. and Northwest Airlines, Inc. Delta paid $48 million to TWA for a 40% stake in the PARS net in the hopes of merging it with its own smaller Datas II network.

Current plans are for WORLDSPAN to integrate the best applications from Datas II and the PARS nets into a third independent airline reservations-only network. In contrast to Datas II and PARS, WORLDSPAN will be tailored to travel agents exclusively, company officials said.

Once the independent WORLDSPAN network is up and running, officials said, Datas II will be disbanded while PARS will continue providing airline support and operations services to TWA, Northwest and Delta.

Most other airline reservation nets support a combination of reservations and airline operation services, such as flight monitoring and baggage and freight scheduling.

Leaving airline services operations to a separate network will enable WORLDSPAN to concentrate on enhancing reservation applications and increasing direct ties with local businesses, restaurants and hotels.

"There will be no downtime," said Tom Hunt, a 17-year veteran with Delta who is now vice-president of data processing and communications services at WORLDSPAN. "The two systems will be up and running until we bring up a third system for travel agents only."

The new WORLDSPAN network will serve the 13,000 travel agencies currently supported by the two nets and will immediately command 26% of the domestic travel reservation marketplace dominated by AMR Corp.'s SABRE, which has a 35% share.

Analysts agree that by focusing exclusively on travel agents, WORLDSPAN will be able to carve out a bigger slice of the huge computer reservation market dominated by SABRE.

According to James Pruitt, an independent consultant and former regional manager of telecommunications for American Airlines, Inc., top-notch computer reservation services offer a spate of services including booking preferred in-flight meals and seating to specific hotel and rental car reservations ("Fly me," *NW,* Aug. 14, 1989).

It is still too early to tell what the configuration for the WORLDSPAN net will be, though company officials have said the

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Managers use many ways to get prospects

continued from page 23

position at another company.

"Most telecom people don't look at ads, so it takes a little selling to get them motivated to take a look at something else," McCaig said.

McCaig also said headhunters can recruit candidates from companies that compete directly with his own company, something that McCaig is reluctant to do because it might encourage a competitor to raid his staff.

Of course, the downside of headhunters is their fee, which can be as high as 35% of the candidate's first-year salary. For this reason, many network executives try to leverage other options when they can.

Leonard Evenchik, director of communications for the Commonwealth of Massachusetts, said he attends trade shows in part to meet network managers who might be qualified for positions in his division. He makes a point of talking with session speakers whom he finds particularly knowlegeable and capable. "Public speaking is a stressful situation, so you know if someone shines in that situation, they are likely to be a fairly qualified person," Evenchik said.

In addition, Evenchik said he often advertises in college alumni newsletters or magazines, or posts openings in alumni placement offices. He also maintains close affiliations with professional associations, which he says are "an extremely fertile arena to meet active professionals in the industry."

Jerald Marcone, assistant vice-president of telecommunications at Crum & Forster Corp. in Morristown, N.J., said working through personal contacts is the best way to find reliable people, and it's a lot less expensive than headhunters, advertisements and job fairs.

"People who you know personally would be hesitant to recommend somebody who isn't capable," he said.

Marcone said his company makes use of all hiring options in fairly rapid succession. When a position is posted, people first try to tap into their personal networks to see if they know someone who matches the job description. At the same time, the company's personnel department places ads in local papers and works with headhunters.

For most network managers, using advertisements is a scatter-shot approach to hiring the right people. One advertisement can generate hundreds of resumes but few qualified candidates. Moreover, sifting through the resumes can take up valuable time, and ads can be fairly expensive. A classified ad can cost as much as $4,000 to $5,000.

But McCaig said he relies on advertisements when he's posting a lot of related jobs. Some people may not be suitable for the position for which they're applying, but they may be qualified for another opening.

"Ads allow us to mix and match a bit more," McCaig said.

Execs plot course for reservation net

continued from page 23

data center will be in Atlanta and the marketing forces will be in Kansas City.

Already, DP teams within WORLDSPAN, consisting of separate technicians from Datas II, PARS and Delta, are wrestling with the logistics of the merger.

Currently, the PARS system has its hub in Kansas City with a backbone of T-1 and 56K bit/sec leased lines linking centrally located IBM mainframes to concentrator nodes in 18 airports and reservation centers around the country. The concentrator nodes contain multiplexing equipment that routes information from the data center over 9.6K bit/sec leased lines to individual travel agencies.

The Datas II center is in Atlanta, with mainframes and nodes in 11 airports and reservation centers throughout the U.S.

Hunt said both PARS and Datas II currently run homegrown applications based on an IBM transaction-processing facility (TPF) six-bit airline control center protocol (ACL). But the merger of the systems will not be easy, he said, because the actual characters within the TPF/ACL protocol are used differently in both systems. Thus far, WORLDSPAN officials are unsure which protocol the system will support.

Right now, the two systems serve almost 50,000 individual travel agents in 13,000 agencies around the world. According to Hunt, there are very few overlaps between the two services, although a small number of agencies may subscribe to both, using one as their primary service provider and one for backup.

Hunt said he will have no details about the features the WORLDSPAN net will support until he gets a full rundown on the distinct capabilities of Datas II and PARS.

Everyone involved in the merger agrees that the key to increasing WORLDSPAN's share in the competitive computer reservation market will be its ability to retain the parts of both systems that are attractive to individual travel agents.

To that end, top officials of WORLDSPAN were culled from the ranks of both Datas II and PARS. Cal Rader, former vice-president of marketing automation for Delta, is WORLDSPAN's chief executive officer, while former PARS president, Efrain Zabala, is chief operating officer.

At the outset, WORLDSPAN will have a skeletal managerial work force evaluating the capabilities of both systems.

Most technical employees at PARS will remain with the new airline services provider, while its marketing people will join Datas II employees at WORLDSPAN.

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

Starting May 6, London's city code will be changed from 1 to 71 for the city's center, including the financial district, and 81 for outer London, including Wembley, Heathrow Airport and Wimbledon.

World News

Japan's domestic carrier, **Nippon Telegraph and Telephone Co. (NTT)**, expects to report $41 billion in revenue and profits of $2.8 billion during the fiscal year ending March 31, 1991, according to a business plan the carrier recently filed with the country's Ministry of Posts and Telecommunications.

NTT also said it plans to spend about $9.6 billion upgrading facilities. NTT figures it will earn some $33 billion from basic telephone services and $3.27 billion from private-line sales. NTT expects to provision about 82,000 analog and low-speed digital circuits and 1,000 high-speed digital circuits during the year.

The Los Angeles-based international carrier **IDB Communications Group, Inc.**, recently began offering service over the Trans-Atlantic Telecommunications-8 (TAT-8) and Private Trans-Atlantic Telecommunications-1 (PTAT-1) undersea fiber-optic cables.

Prudential-Bache Securities, Inc. is the first user of IDB's PTAT-1 service, purchasing one 768K bit/sec circuit from the carrier to transmit traffic to and from London.

Merrill Lynch & Co, Inc. is IDB's first TAT-8 user, purchasing two 2.048M bit/sec circuits to carry traffic to London. A company spokesman said that by October, however, Merrill Lynch will move its circuits from IDB facilities to MCI Communications Corp. facilities as part of a custom network deal with the carrier.

Legal groups working on rules for international EDI

U.S., foreign bodies to form model agreements.

By Salvatore Salamone
Features Writer

Companies seeking to establish electronic data interchange links with international trading partners must certainly overcome technical obstacles, yet legal obstacles may prove more difficult to resolve.

To help formalize the arrangements between international trading partners, legal groups in several European countries, the U.S., Canada and the U.K. are working on interchange agreements that will serve as models for companies seeking to exchange information using EDI.

Interchange agreements cover many aspects of EDI transactions. A typical agreement includes details on how to handle technical, security and legal issues, as well as specifies which manuals and nets to use.

A trading partner agreement is an intense relationship, according to Daniel Cooper, a partner with the Toronto law firm of McCarthy Tetrault. Cooper's remarks came at a recent seminar in Dallas called "EDI: Letters of the Law," which was cosponsored by the Data Interchange Standards Association, the National Institute of Standards and Technology and the Accredited Standards Committee X12.

"The intent of the interchange agreement is to set down the ground rules," Cooper explained. "After the parties specify which EDI protocols they'll use and select the network, such as whether to use a third-party network, the rest should be solid.

"From that point on, an EDI transaction should be like a check. By that I mean if you put a check into circulation, the results are pretty certain. The EDI environment should be the same," Cooper said. "Trading partners want complete reliability once the message goes into the system. They want to have as much certainty as possible."

(continued on page 26)

Upgrade of U.K. messaging node lets AT&T reach out

By Barton Crockett
Senior Editor

LONDON — AT&T recently enhanced its electronic messaging node here as part of a move to expand its international service offerings.

The carrier also announced formation of a new joint venture with Istel, called AT&T Istel Global Messaging Services, Ltd., to supply messaging services to users in Europe using AT&T and Istel facilities.

AT&T purchased Istel, a U.K. service provider and systems integrator, for $280 million last fall.

The node AT&T enhanced here is a Datakit packet switch the carrier has used since September 1989 to offer electronic mail and packet-switching services to users in the U.K., primarily for communications to the U.S.

AT&T enhanced the node by installing 3B minicomputers and software that will enable it to offer electronic data interchange transmissions to the U.K. and to users subscribing to the Istel network. The upgrade will also allow the carrier to offer an array of advanced services such as a store-and-forward facsimile service.

These services are offered over AT&T's Global Messaging network, a packet-switched network the carrier uses to supply EDI, AT&T Mail and AT&T Enhanced Facsimile in the U.S.

According to Jenny Goldstein, AT&T's product manager for global messaging services, the carrier's only other foreign messaging node is in Tokyo.

She said the Tokyo node should also be upgraded in the next few months, pending regulatory approval to supply advanced messaging services there. Still other new nodes will be installed in Japan and other countries in the future.

International call

Goldstein said that upgrading the U.K. node will save users here the cost of calling the U.S. to access AT&T's Enhanced Facsimile service. She said users rarely do this now because of the cost.

When AT&T begins supporting Enhanced Facsimile locally, which is expected to happen in the next few months, users will only need to call the local node here. Goldstein said AT&T may cut over other Enhanced Facsimile nodes in the U.K. if demand develops. She said that to her

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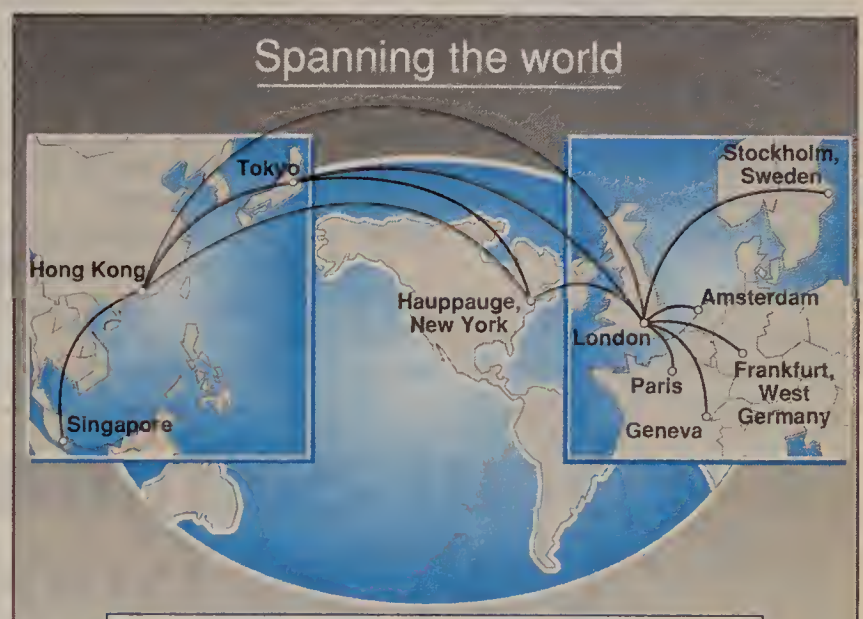
GLOBAL STRATEGIES



Net overhaul helps Reuters stay on top

By Barton Crockett
Senior Editor

LONDON — Reuters Holdings PLC is in the midst of a network upgrade that will help the firm accommodate international business growth and offer advanced new services.

To support rising traffic volumes caused by skyrocketing sales of its on-line financial information services, Reuters has installed over the past several months several Nx64 circuits — the European equivalent of fractional T-1 service.

Tony Cornish, deputy international communications manager at the firm, said Reuters is one of the first companies to use Nx64 internationally in Europe.

Later this year, Reuters also plans to start using satellites to broadcast financial information and its news service to European subscribers. This will enable the firm to distribute information faster and make the company one of the first pan-European users of one-way very small aperture terminal technology ("EC, carriers move toward liberalizing VSAT market," *NW*, March 5).

"It's fair to say we push for facilities as soon as carriers can make them available," said Peter Smith, Reuters' international communications manager.

One of the basic needs driving the network upgrade is the growth in Reuters' core information services businesses. These include the distribution of price quotes for securities and foreign currency trades, electronic trading networks for foreign currencies, securities and futures contracts, and the distribution of Reuters' news service to publications and traders around the world.

Sales of these services have been growing steadily over the past few years, contributing to the company's healthy 18.3% increase in total sales last year to $1.9 billion and a 31.4% boost in pretax profits to $455.7 million.

In order to support the increase in network traffic brought about by its business growth, Reuters is replacing several dedicated voice-grade circuits with multiple Nx64 circuits linking the network hub here with European financial centers.

> "It's fair to say we push for facilities as soon as carriers can make them available."
>
> ▲▲▲

Two 1.024M bit/sec Nx64 links to Paris are only now being cut over. Over the past few months, several Nx64 circuits at speeds ranging from 256K to 384K bit/sec have come on-line connecting the hub here to Amsterdam, Geneva and Stockholm, Sweden.

Cornish said the Nx64 links are only now going in because carriers could only recently provide the capacity. "Their terrestrial networks have only recently gotten to the point where they can support it," he said.

Smith said that the Nx64 links

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Net overhaul helps Reuters stay on top

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will enable Reuters to support more traffic than could be accommodated on the analog facilities for about the same cost.

Because of rising network traffic volumes, Reuters last week also upgraded a 128K bit/sec link between New York and Tokyo to 512K bit/sec. The link runs over the Hawaii-4/Trans-Pacific Cable-3 undersea fiber-optic cable, while the European links run over each of the four undersea fiber-optic cables spanning the English Channel.

Cornish said that Reuters' strategy is to migrate to fiber optics on its backbone network wherever possible. He said that the firm provides for redundancy by purchasing capacity on multiple cables or by using satellite facilities.

Satellite initiative

On the heels of these upgrades, Reuters also plans later this year to begin using satellite facilities to distribute news and financial information to its customers in Europe. If the plans come to fruition, Reuters will be one of the first pan-European users of one-way VSAT services — something which until recently has been largely prohibited in Europe.

Reuters wants to migrate to satellite facilities because the technology will enable the firm to offer advanced services and cut costs.

For example, one-way satellite distribution allows Reuters to send data to its customers at speeds of up to 168K bit/sec, something which is uneconomical with terrestrial facilities.

According to Patrick Mannix, Reuters' director of group quality programs, using satellite communications will enable the company to dismantle several costly European data centers and downsize others that are used to support the firm's terrestrial European network.

Reuters already uses satellites to transmit information to some 3,000 locations in the U.S., and a similar number could be served in Europe, according to Cornish.

Interactive services, such as Reuters' trading networks, will likely be handled by terrestrial facilities for the foreseeable future, Smith said.

Legal groups working on rules for int'l EDI

continued from page 25

The current prototype interchange agreements, while seeking to simplify the legal issues a company faces when linking up with international trading partners, are not a panacea. The main difficulty is that each country's document specifies different conditions for a legal agreement. For example, each countries' document handles liability differently. The party responsible for damages if an EDI transaction fails varies from country to country.

Still, the main focus of each country's interchange agreement is to ensure that the message received is the same one that was sent. Making sure the message gets through, however, is approached differently in different countries.

In the U.S., there are laws covering electronic transactions in general that include the concept of an electronic signature as well as steps to ensure a message's integrity. In the U.K., the interchange agreement does not call for an electronic signature. In fact, it does not even address what constitutes an electronic signature.

The legal issues in verifying the authenticity and integrity of an EDI message are complex, according to Hans Thompson, legal director of the Export Council of Norway. "What is needed is akin to [write once, read many times] technology. That is, the message is written into the interlinking network system once. Legally, its contents cannot be altered, yet the information may be read many times," he said.

Liability issues are treated differently in various agreements.

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Liability issues are treated differently in various countries' interchange agreements. For example, who is liable if a manufacturer makes a payment to a supplier by electronic funds transfer and the payment is delayed because the third-party network used for the transaction goes down?

In many cases the value-added network (VAN) is responsible for any liability arising from its failure to deliver the electronic message. However, this is not always the case. In the proposed Standard for Interchange Agreement produced by the Legal Advisory Group of the EDI Association of the U.K., if either party entering into an EDI trading partner agreement instructs the other party to use a third-party network, that party will be responsible for losses incurred if the third-party net fails.

The interchange agreements cover other issues as well. For example, the documents specify what legal means will be used to settle disputes between trading partners. Here again, there are differences. In Canada, disputes are settled by an arbiter, while in the U.K version, there is no arbitration rule.

"Disputes are settled in the English courts, not by arbitration," said Ian Waldon, EDI business analyst with the Midland Bank PLC in London. "In the U.K. document, there is no special clause on liability. That's because EDI is thought of as only a means of communications," Waldon said. "From a legal standpoint, EDI does not change the way business is done."

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RISC System/6000	MIPS	MFLOPS (DP)	3D Vectors (K/SEC)
POWERstation 320	27.5	7.4	90

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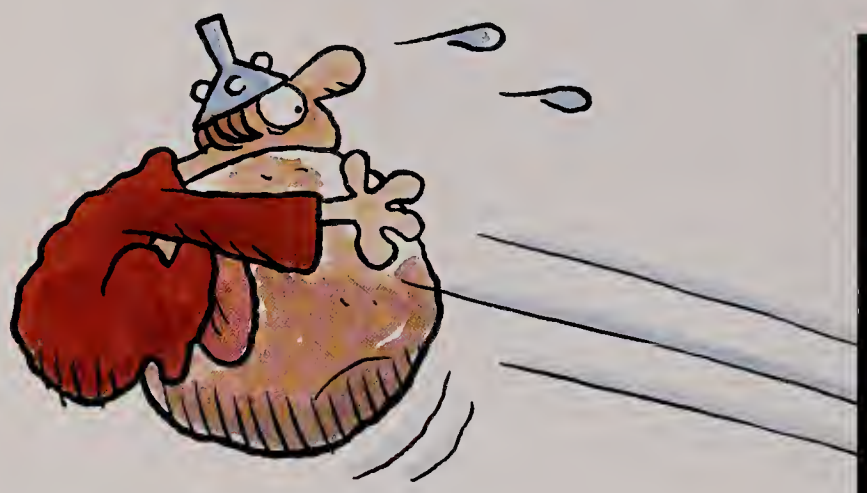
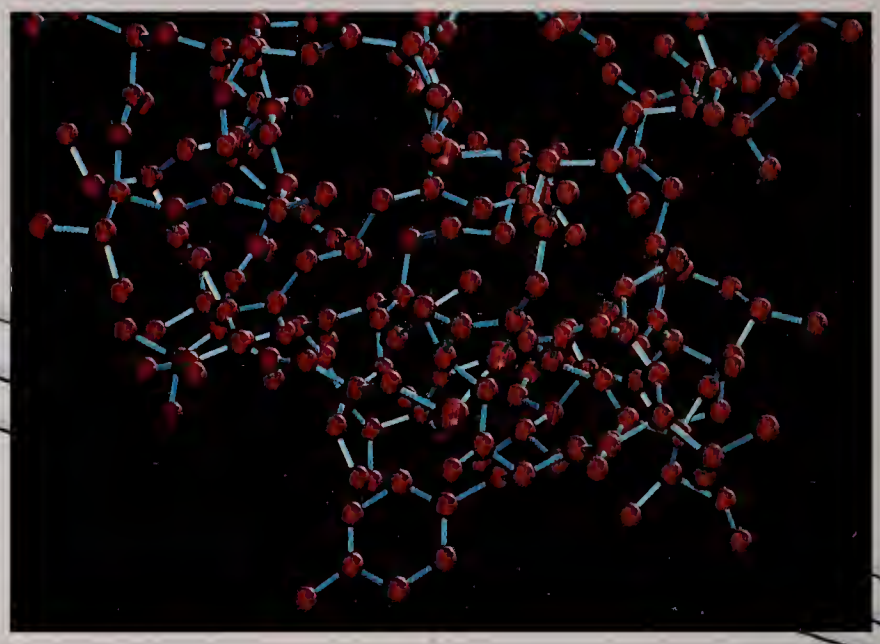
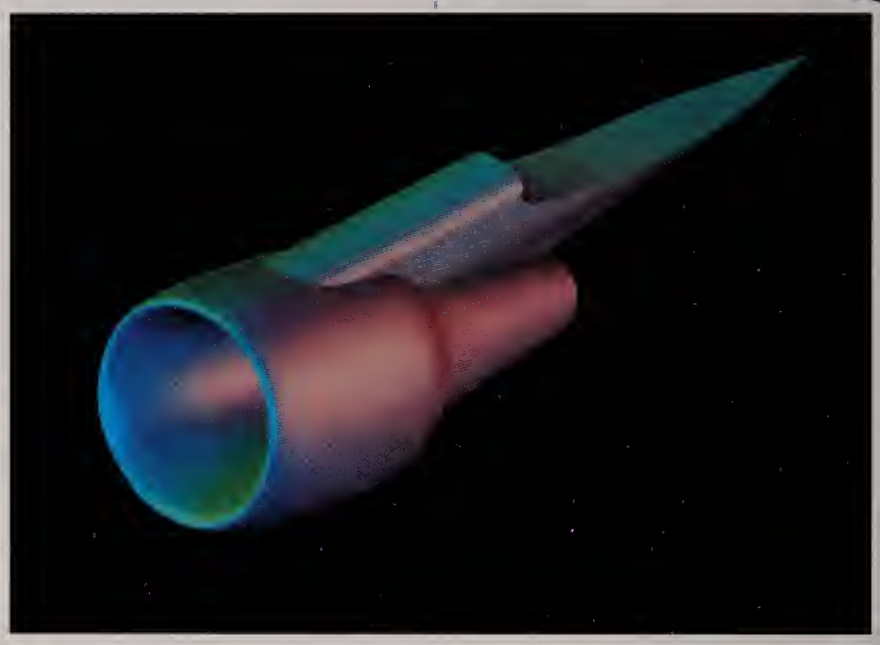
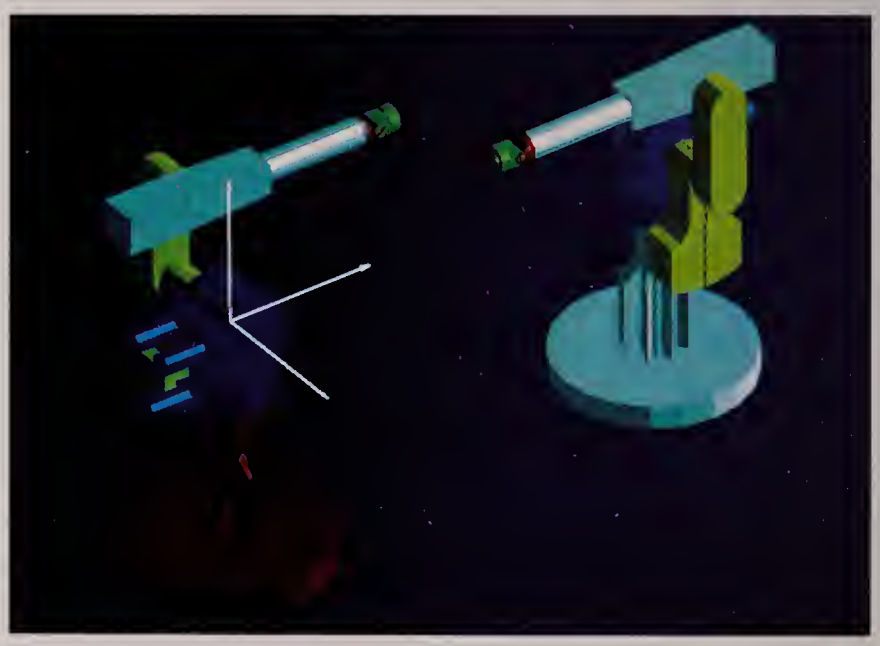
3D graphics performance









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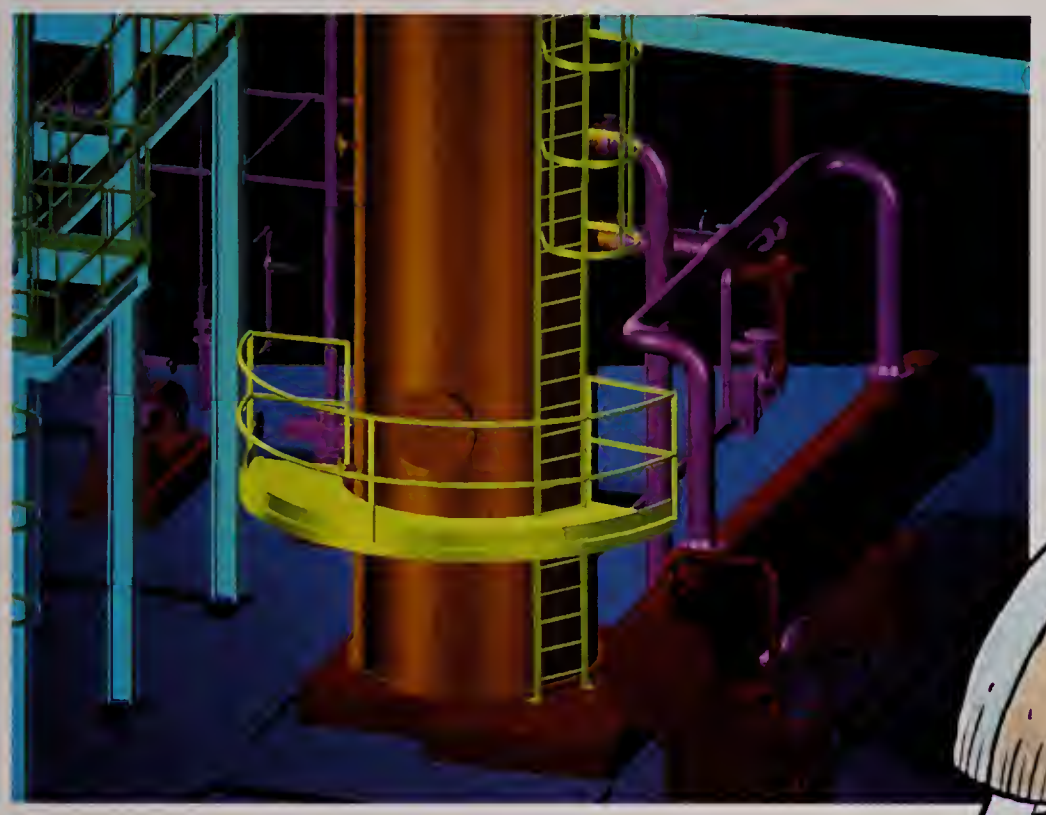

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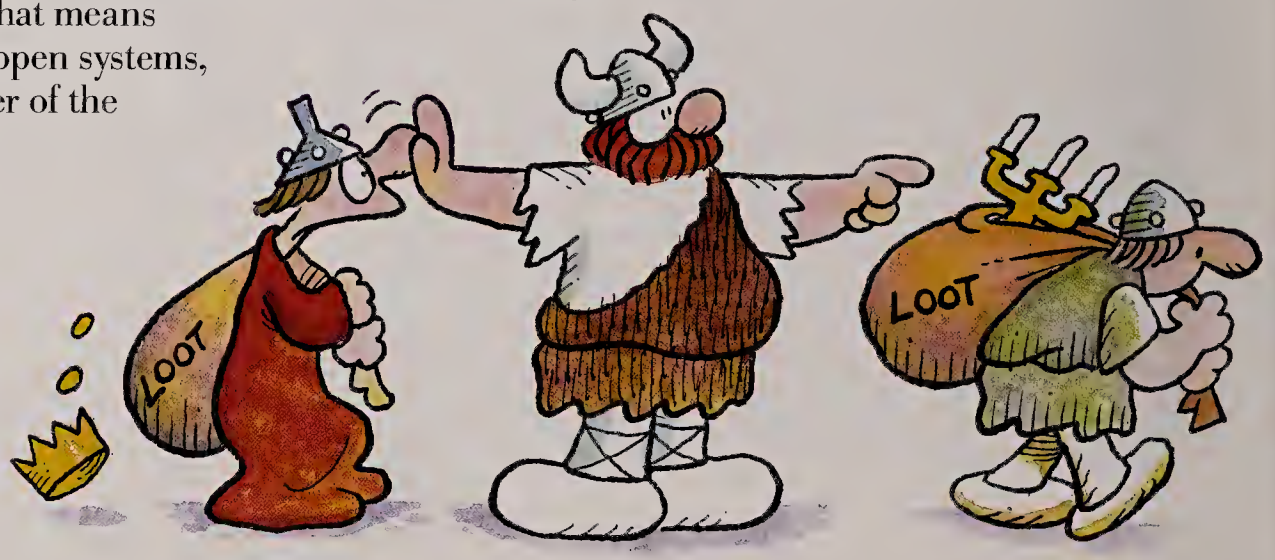


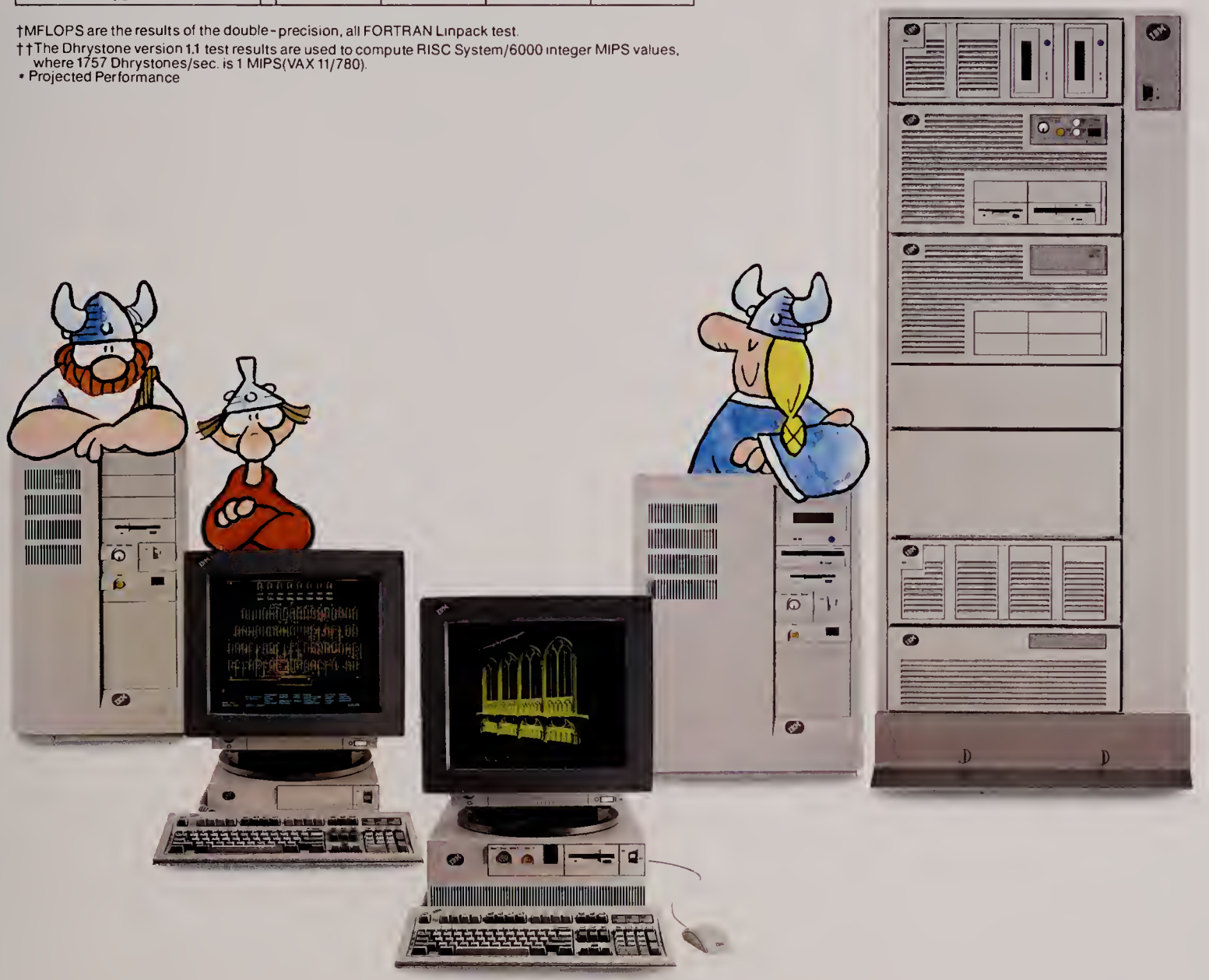
The RISC System/6000 family. Choose your weapon.

There's a RISC System/6000 POWERstation or POWERserver to conquer any need, from a single user's desktop requirements to the demands of an army of concurrent users. Each member of the family comes in a wide variety of configurations, so you can choose among display sizes and disk storage and graphics processing capabilities. For low cost-per-user LAN solutions, there's even a new, high-performance IBM Xstation 120.

	RISC System/6000 POWERstations			
	320	520	530	730
Package	Desktop	Deskside	Deskside	Deskside
MFLOPS (DP)†	7.4	7.4	10.9	10.9
MIPS††	27.5	27.5	34.5	34.5
Maximum Memory	32MB	128MB	128MB	128MB
Internal DASD Capacity	640MB	2.5GB	2.5GB	2.5GB
Total Memory Slots	2	8	8	8
Total Micro Channel I/O Slots	4	8	8	8
Graphics 3D Vectors (K/sec)	90	90	90	990*
Graphics Shaded Polygons (K/sec)	10	10	10	120

RISC System/6000 POWERservers				
320	520	530	540	930
Deskside	Deskside	Deskside	Deskside	Rack
7.4	7.4	10.9	13	10.9
27.5	27.5	34.5	41.1	34.5
32MB	128MB	128MB	256MB	128MB
640MB	2.5GB	2.5GB	2.5GB	12GB
2	8	8	8	8
4	8	8	8	8

†MFLOPS are the results of the double-precision, all FORTRAN Linpack test.
††The Dhrystone version 1.1 test results are used to compute RISC System/6000 integer MIPS values, where 1757 Dhrystones/sec. is 1 MIPS(VAX 11/780).
* Projected Performance



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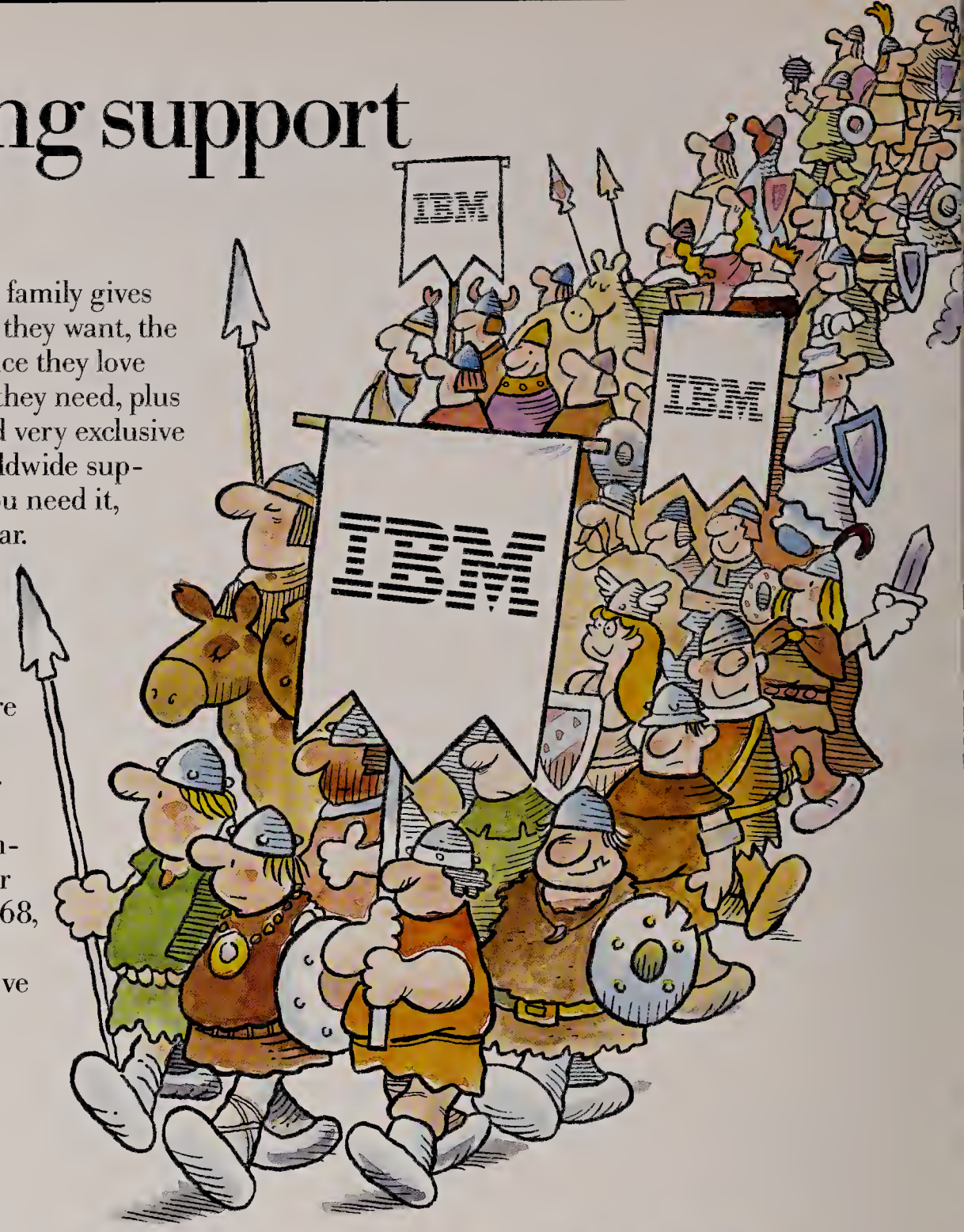

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First Look

UDS adds 5ESS support to adapter

Universal Data Systems, Inc. last week announced that its Integrated Services Digital Network terminal adapter has been upgraded to support AT&T's 5ESS switch.

The **TA100,** available since February, previously supported only Northern Telecom, Inc.'s DMS-100 but now supports both switches. The stand-alone hardware device links terminals, personal computers, minicomputers and mainframes to an ISDN Basic Rate Interface (BRI) line, which provides two 64K bit/sec bearer channels and one 16K bit/sec signaling channel.

TA100 supports asynchronous data transmission from 300 to 19.2K bit/sec and synchronous transmission from 1,200 to 64K bit/sec.

It also interfaces to standard two-wire telephone sets and can transmit voice and data simultaneously over the BRI line.

Both the DMS-100 and 5ESS support the standard ISDN Link Access Procedure (LAP) D protocol in the signaling channel.

However, Northern Telecom and AT&T use different data rate adaption protocols. The TA100 supports both formats.

The company also plans to support ISDN-standard V.120 rate adaption by midyear.

The modified TA100 will be available in the company's second quarter for $1,500.

Universal Data Systems, Inc., 5000 Bradford Drive, Huntsville, Ala. 35805; (205) 721-8000.

NCD upgrades X/Windows software

Network Computing Devices, Inc. (NCD) last week upgraded the software that runs on its family of X/Window System display terminals to support the latest release of X/Window System software, X11.4.

NCDware 2.1 includes two key features of the X11.4 software released in January by the Massachusetts Institute of Technology X/Window Consortium: support for the X display manager control pro-

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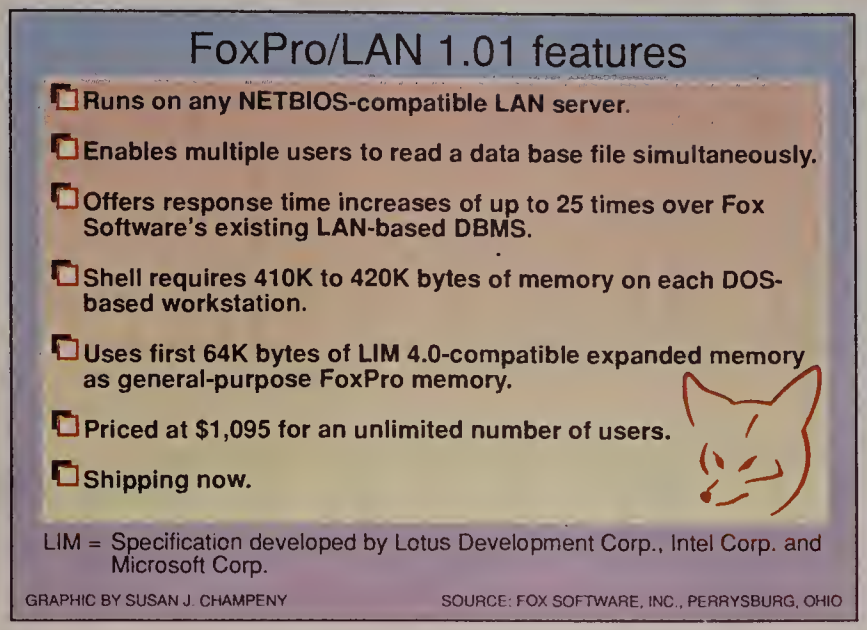

Fox ports single-user DBMS to work on NETBIOS LANs

FoxPro LAN faster than firm's other DBMSs.

By Tom Smith
New Products Editor

PERRYSBURG, Ohio — Fox Software, Inc. recently introduced a version of its FoxPro data base management system that runs on any local-area network that supports Network Basic I/O System protocols.

In addition to serving multiple users for the first time across a LAN, the new FoxPro/LAN 1.01 offers significant performance improvements over the firm's two other LAN-based DBMSs: FoxBase+/LAN, for DOS and Xenix workstations, and FoxBase+/Mac Multi-User, for Apple Computer, Inc. AppleTalk and Novell, Inc. NetWare networks.

FoxPro was previously offered only in a single-user version.

FoxPro/LAN 1.01 software runs on a DOS-based personal computer positioned as a server. It downloads requester software to workstations on the net.

FoxPro/LAN 1.01 will run on any LAN with a NETBIOS-compatible network operating system, including NetWare and Banyan Systems, Inc.'s VINES.

The server manages file locking so that only one user can modify a file at once. Every user on the network can simultaneously access a single file on the data base, according to Janet Walker, product manager. But if the first user places a lock on that file, only that user can overwrite the existing data.

Each workstation on the LAN requires 410K to 420K bytes of memory for FoxPro/LAN 1.01, which is 10K bytes more than the amount required with the single-user release of FoxPro and 30K bytes more than the memory required for FoxBase+/LAN.

A key upgrade from the existing single-user FoxPro package is the ability to utilize the first 64K bytes of LIM 4.0-compatible expanded memory system (EMS) as general-purpose FoxPro memory. LIM 4.0 is a specification developed by Lotus Development Corp., Intel Corp. and Microsoft Corp. to manage the expanded memory system.

In the earlier release of FoxPro, the first 64K bytes could only be used to speed file I/O between disk drives and workstation memory. Now, by contrast, it can be used for functions such as managing windows, menus and applications, while the balance of the user's EMS will be utilized to speed file I/O.

For networks that have limited available memory, this will enable them to utilize FoxPro for the first time. In addition, the new feature will improve response times for networks with sufficient memory, because it maintains a large amount of available memory, Walker said.

> If the first user places a lock on a file, only that user can overwrite the existing data.
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Finally, Fox Software modified its file- and record-locking technique to offer users up to 25 times faster response on FoxPro/LAN 1.01 than on its existing LAN DBMS packages.

Previously, users sometimes had to make repeated attempts to access a file so that if the first request was unsuccessful, it was repeated until a lock could be placed and the data could be transmitted.

(continued on page 31)

Octel voice-processing pack gets upgrade

Release 10 software lets users partition voice system, tailor functions by department or firm.

By Tom Smith
New Products Editor

MILPITAS, Calif. — Octel Communications Corp. recently upgraded its voice-processing system software to enable network administrators to segment a single system into 10 departmental subsystems.

Octel also unveiled new applications that let network managers further subdivide their voice-processing systems and support enhanced networking features, including the ability to address message recipients by name, regardless of their location.

Together, the new applications and the software upgrade, Release 10, enable companies to tailor departmental systems to the individual business needs of those units.

A company's national service center serving accounts in different time zones, for instance, can have calls routed to the appropriate location depending on the time of day. Or a manager could pick up a phone and broadcast a message to all employees within a department, as opposed to designating the recipients by creating a list and then broadcasting a message to that list.

Release 10 software runs on Octel's Branch, Branch XP, Aspen and Aspen Maxum voice-processing systems. The systems support from four to 72 ports, 5½ to 304 hours of message storage, and 275 to 10,000 users.

The voice-processing systems connect to a multitude of private branch exchanges and central office switches and are in use at end-user sites as well as telephone companies.

Departmental level

With Release 10, users can create, from an ASCII terminal used as a management console, 10 departments within a company or location. Communications between departments, such as purchasing and marketing, is then restricted based on parameters set by the network manager.

(continued on page 30)

Cabletron unveils fiber E-net cards for PCs, Macs

ROCHESTER, N.H. — Cabletron Systems, Inc. last week introduced fiber-optic Ethernet interface cards for IBM Personal Computer XTs, ATs, Personal System/2s and Apple Computer, Inc. Macintosh SEs, SE/30s and IIs.

The new Desktop Network Interface (DNI) cards fit into a single slot in a personal computer bus and provide a single-port link to 50/125, 62.5/125 or 100/140 micron multimode fiber.

Unlike other Ethernet interfaces, the DNI cards have a single-software driver that supports Novell, Inc. NetWare, Sun Microsystems, Inc.'s Network File System (NFS), the File Transfer Protocol, Digital Equipment Corp.'s DECnet, and the Microsoft Corp./3Com Corp. Network Driver Interface Specification, which provides support for 3Com's and Microsoft's versions of 3+Open.

This "concurrent packet driver" will enable NetWare users, for example, to access an NFS application running on a server without having to log off and reboot. They can do this by hot-keying between applications in either environment.

The new interface cards support the Simple Network Management Protocol (SNMP), which means they can be managed on a polled basis by an SNMP-compliant management station or by Cabletron's Remote Lanview/Windows Management software.

Remote Lanview/Windows Management runs on a DOS-based personal computer running Microsoft Windows.

DNI cards also support "string move" instructions, which move multiple blocks of data at a given time. This provides better aggregate throughput than cards using direct memory access, which move data one character at a time.

The DNI cards are available now. The XT card costs $399, the AT card costs $799, the PS/2 card costs $899, and the Macintosh card costs $949.

Cabletron can be reached by writing to 35 Industrial Way, P.O. Box 6257, Rochester, N.H. 03867, or by calling (603) 332-9400.

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McDATA

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Octel voice pack gets upgrade

continued from page 27

Octel also built several custom features into the software that can be tailored to each system. One is an after-hours destination feature that would give a marketing department, for example, the ability to route calls to a specific mailbox on the voice-processing system after business hours, when no marketing people are available to answer them.

Bulletin broadcast

Another of these custom-tailoring features is called bulletin broadcast, which enables users to broadcast a message to a given department automatically. In the past, users could broadcast messages, but because there was no departmental segmentation, they had to create lists of recipients.

Since the software previously did not allow users to subdivide a system, all users, regardless of location or department, had the same capabilities and could communicate with all other users. Now, communications can be restricted as needed.

Bulletin broadcast lets users broadcast a message to a given department automatically.

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Previously, the only restriction that could be placed on messaging was to prohibit users from leaving voice messages, which meant they could only receive them, according to Margaret Norton, director of customer premises equipment marketing at Octel.

Along with the new system software, Octel introduced new applications that run under it. Among these are Index I, which enables users to divide their system into 10 companies, and then to divide each of those companies into 10 departments.

Another optional package, Index II, supports as many as 200 companies. It can also be broken down into 10 departments.

Octel Index I is designed for smaller telephone companies, cellular service providers and end-user organizations with multiple locations. Octel Index II is designed for Bell operating companies, large independent telephone companies and large cellular providers.

Index I and II offer a feature called selective send, which enables users to specify which companies can communicate with one another.

AspenNet enhancements

Finally, the company unveiled enhancements to its AspenNet software, which enables separate Octel voice-processing systems to exchange messages as if they were on the same local system.

Among the AspenNet enhancements is network dial-by-name, which allows users for the first time to leave a message with another user on another system simply by addressing it to that person's last name.

In the past, users had to know the node address and mailbox number of the message recipient, which was more difficult to remember, particularly when the recipient changed locations.

Release 10 and the accompanying optional software packages will be available by the end of May.

Upgrading to Release 10 will cost from $2,000 to $12,000. Index I and II, which require Release 10, cost between $5,000 and $11,000. Bulletin broadcast is an optional feature that requires Release 10-equipped systems and will cost between $1,000 and $2,000.

Enhancements to AspenNet are included with the purchase of the basic package, which is priced between $3,160 and $5,250. Current AspenNet customers will receive the enhancements free with the purchase of Release 10 software.

All prices vary according to the system on which the software runs.

Octel can be reached by writing to 890 Tasman Drive, Milpitas, Calif. 95035, or by calling (408) 942-6500.

Fox ports DBMS to work on LANs

continued from page 27

Now, however, since a lock does not have to be placed automatically, users do not have to make multiple requests to receive it. This reduces traffic and improves response time.

The existing LAN-based systems will still be sold because some users will not want to absorb the extra memory or do not require the improved speed offered by the earlier version, Walker said.

FoxPro/LAN 1.01 is available now for $1,095 in an unlimited-site license.

Fox Software can be reached at 134 W. South Boundary, Perrysburg, Ohio 43551, or call (419) 874-0162.

First Look

continued from page 27

tocol (xdmcp) and the ability to support nonrectangular windows.

NCDware 2.1 runs on the company's NCD16, an X/Window System terminal with a 16-in. monochrome monitor; NCD 19, which has a 19-in. monochrome monitor; and NCD 17c, which has a 17-in. color monitor.

Support for xdmcp lets the user log onto a host processor from a window without first having to establish a Telnet terminal-emulation session, an additional step that was previously required.

X11.4 permits the creation of circular or oval windows, as opposed to the rectangular windows supported before. With this feature, X/Window System applications can use oval buttons, for example, or display a round clock face, which are the types of features being offered in X/Window System application software packages.

Support for these features brings the NCD terminals into compliance with most of the X11.4 features. Other upgrades for performance optimization will be supported by midyear, the company said.

In addition to adding support for X11.4 standard features, NCD has added several capabilities unique to its X/Window System terminal line. These include support for multiple local Telnet clients.

In the past, users could only support a single Telnet client, but now users can support multiple clients and also cut and paste between them. As part of this feature, users can access as many as four applications residing in hosts that do not support the X/Window System via Telnet windows controlled by the X/Window System server.

An NCDware 2.1 upgrade is available free of charge to customers enrolled in NCD's software support program.

Network Computing Devices, Inc., 350 N. Bernardo Ave., Mountain View, Calif. 94043; (415) 694-0650.

Modems now support dial-back security

Fastcomm Communications Corp. recently announced new versions of its V.32 and V.22bis modems that support dial-back security.

The **FDX 9696S** V.32 modem and the **FDX 2448S** V.22bis modem with dial-back capabilities now support three levels of security, whereas their predecessors, the FDX 9696 and the FDX 2448, supported only two levels.

When the FDX 9696S or the FDX 2448S receive a call, they request the caller's user identification and then search a predefined list of up to 256 authorized names. If the caller's user name is not in the list, the modems will terminate the call. If the name is on the authorized list, the modem will call back the originating modem. Prior to the modems' implementation of dial-back security, they supported hardware checks and modem passwords.

The full-duplex modems support dial-up and leased-line connections, and operate in synchronous and asynchronous modes.

Both modems are available now. The FDX 9696S costs $1,199; the FDX 2448S costs $849. Existing FDX modem users can upgrade their firmware to support dial-back security for $275.

Fastcomm Communications Corp., 12347-E Sunrise Valley Drive, Reston, Va. 22091; (703) 620-3900 or (800) 521-2496.

OPINIONS

WIDE-AREA NETWORKS

BY JAMES KOBIELUS

Wading through the maze of user interfaces

A busy network interface is the last thing a busy user wants to see. Many complex data networks are, from a user's point of view, resource-rich but horribly cluttered — like a gaudy digital watch that crams too much information into a small space. A user looking for the truly important information, the time of day, must mentally screen out the trivia.

Contributing to the network interface information overload problem is the clash between distinct interfaces encountered within a particular user session. It's not unusual for users to navigate through a half-dozen or more distinct on-line system environments in search of a single morsel of information.

For example, the average session on the Advanced Research Projects Agency Network may involve slogging through a personal computer operating system, local-area network operating system, communications software package, source host operating system, source host file-transfer utility, remote LAN operating system, remote host operating system and remote host file-transfer utility.

> Developers must provide users with simple access to information.
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Each of these environments throws up barriers to the hapless user — special logon procedures, command sets, screen formats, file management procedures and system messages.

Developers must provide users with simple access to information in a familiar format. Wherever possible, separate systems environments must be collapsed into a single look and feel. Passage through heterogeneous environments must be carried out automatically and invisibly.

IBM's Systems Application Architecture (SAA) and related network application development platforms are good attempts at this. They provide users with a single look and feel in a network environment based on an Apple Computer, Inc. Macintosh-like graphical user interface.

SAA and similar environments create a grand illusion: an entire network that resembles a single machine. However, graphical interfaces don't deliver simplicity; although fun to use, they're not simple or straightforward. They scatter the user's attention and bombard the eyes with stacked windows and cryptic icons. By contrast, one of the saving graces of command-line text interfaces, such as trusty old DOS, is how nicely they draw the user's attention toward the blinking cursor.

A discipline to which system developers should pay close attention is data fusion — a means of chunking multiple data streams so that the user may understand them at a glance. Typically associated with tactical weapons systems, data fusion often works best with multisensory interfaces incorporating graphics, colors, animation, sound effects and even textures.

Another discipline that should be brought to bear on interface design is semiotics, the study of symbol systems. Most graphical computer icons are a lampoon on semiotics, since they possess little of the universality or familiarity needed to make them truly user-friendly — for example, the stylized "W" in Microsoft Word for the Macintosh environment. Most icons don't intuitively tell you what the function is; often, the significance must be explained to you.

These and other human factors must figure into the design of user interfaces to distributed data resources. Too often, traditional network interfaces treat users like intruders, losing them in a labyrinth of trap doors and blind alleys.

Kobielus consults on information technology in Alexandria, Va.

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(508) 875-6400
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An IDG Communications Publication

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EDITORIAL

Congress should think twice before further burdening FCC

Congress is once again considering legislation that could dramatically alter the communications industry landscape by giving the regional Bell holding companies more market latitude.

Under a bill sponsored by Rep. Edward Markey (D-Mass.), the RBHCs would be granted new freedoms in manufacturing and in providing information services.

Much of the oversight of the carriers would be shifted from the bench of U.S. District Court Judge Harold Greene to the Federal Communications Commission. The FCC is currently under the leadership of Chairman Alfred Sikes, who has expressed his eagerness for the agency to take on these new policing responsibilities.

The merits of the Markey bill, including whether its safeguards are adequate to prevent anticompetitive abuses, are debatable. Whether Congress should be establishing a comprehensive national telecommunications policy that does away with much of the Modified Final Judgment just six years after divestiture is also arguable.

And, whether the RBHCs should be allowed to enter markets from which they are currently barred and who should properly have oversight of the carriers can be debated ad infinitum.

But one thing is certain: If Congress forges ahead with this plan, or any similar plan, it must be committed to providing the FCC with the resources needed to handle new oversight responsibilities.

Given the focus on deficits and budget cutting on Capitol Hill these days, could Congress really make good on such a commitment? Users are concerned about whether the FCC has the manpower and budget to handle its current responsibilities. For

> If Congress forges ahead with this plan, it must provide the FCC with the resources needed to handle the new responsibilities.
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example, some users saw the FCC's recent enforcement action against Nynex Corp.'s Materiel Enterprises Co. as an isolated event rather than illustrative of effective, ongoing oversight of the RBHCs.

Users and others have also expressed concern about the FCC's plodding, piecemeal handling of major tariff issues, such as Tariffs 12, 15 and 16.

In the last five years, the FCC's budget has shown no real growth and, in fact, staffing within the agency's Common Carrier Bureau has gone down slightly.

If the agency is asked to begin monitoring the RBHCs' activities in entirely new market arenas and is not given significant new resources, a very real danger exists that its efforts in other areas may be hurt. Work on major issues, such as price caps for local exchange carriers, could be delayed or tariffs could take effect without proper investigation.

In the fervor of creating a new national telecommunications policy and unleashing the competitive power of the RBHCs, Congress may initially provide the FCC with some additional funding.

But what happens in the future is the real concern.

Five or 10 years down the road, when the RBHCs have mobilized and are making their mark on these new markets, will the FCC have the money and manpower it needs to police the carriers? Will Congress — which may be facing even greater concern over the federal budget deficit — still be as committed to providing the resources required for the agency to effectively handle the duties assigned to it?

Unless Congress is willing to make this long-term commitment, it should think twice before changing the rules of the game.

OPINIONS

STANDARDS

BY STEVEN TURNER

User involvement key to successful standards setting

Standards are clearly supposed to benefit end users. However, once standards are developed, they often don't provide the services and options users need. The only solution to this dilemma is for users to become more directly involved in the standards-making process.

Users sometimes misinterpret the function of standards. To some, standards are just one part of the game manufacturers play with one another, each vendor pitting its technological strengths against the weaknesses of other companies for its own business advantage.

The real purpose of telecommunications and information processing standards is to reduce users' costs and increase product compatibility. Standards should also minimize the disruptive impact of new technology on end users, who may view computers and communications devices affected by these standards only as tools that help them do their jobs better.

Users can minimize these disruptions by helping shape the standards that are the basis for those products. Only users really understand what they need; the more input they have, the more useful the resultant standard will be.

Most standards bodies are open and solicitous of user participation. In some cases, users are invited to become full voting members. In other cases, users play an important advisory role, providing valuable technical and market information to the standards body without actually voting on the developed standard.

While most standards bodies require some fee to participate, users are often afforded special status as invited, nonpaying guests or pay only a minimal attendance charge — evidence that standards bodies welcome user participation with open arms.

Turner is a technical staff manager at Universal Data Systems, Inc. in Huntsville, Ala.

Among the most influential telecommunications standards committees in the U.S. is the ANSI X3 Committee for information systems, which covers a wide range of topics from data communications and Open Systems Interconnection to computer languages and storage devices.

The only requirement for prospective members of the X3 committee is that they be directly and materially affected by the activities of the group, which includes virtually anyone who uses computers or communications devices. All members of the X3 committee, whether users, manufacturers or service providers, are invited to participate actively in the work of the committee.

> Users can also affect international standards through participation in U.S. committees.
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Other standards committees in need of user input are the T-1 Committee, a communications-oriented committee that develops standards for network interfaces, system quality, and performance and data communications equipment, and the Institute of Electrical and Electronics Engineers, Inc., which develops standards for the connection and performance evaluation of all sorts of electronic devices.

Like the ANSI X3 Committee, the only requirement for membership in the T-1 Committee is to be directly and materially affected by the standards it produces. Participation in an IEEE committee merely requires individual membership in IEEE, and expert users are openly sought.

The Electronics Industries Association, while representing the interests of manufacturers, welcomes user participation and input on most of its technical committees. The reason is simple: Manufacturers recognize that it is in their own best interest to include users in every phase of the standards-making process.

Users can also affect international standards through participation in the above U.S. committees since most domestic standards bodies funnel their output into one of the major international bodies such as the Consultative Committee on International Telephony and Telegraphy, the International Standards Organization (ISO) and the International Electrotechnical Commission (IEC).

Since the CCITT is a United Nations-sponsored treaty organization, the U.S. voting member in the CCITT is a representative of the U.S. State Department, but technical advisers, including qualified users, form the U.S. delegation to CCITT meetings.

The ISO and IEC are voluntary standards bodies in which ANSI represents the U.S. By participating in the development of ANSI-accredited standards, such as T-1 and X3, users contribute to the standards these international organizations develop.

Opportunities abound for user involvement in standards development. The invitation is open, and the welcome mat is out. Users should recognize the value of participating. It's a way — in fact, the only way — users can ensure that new technology provides the features and growth opportunities they need to do their jobs well.

The end result is a better product made by a wider choice of vendors at a competitive price — the real benefit to users who participate in standards making.

Only when users understand these benefits will they get involved, and only then will they see their long-term investment in standards participation begin to pay off.

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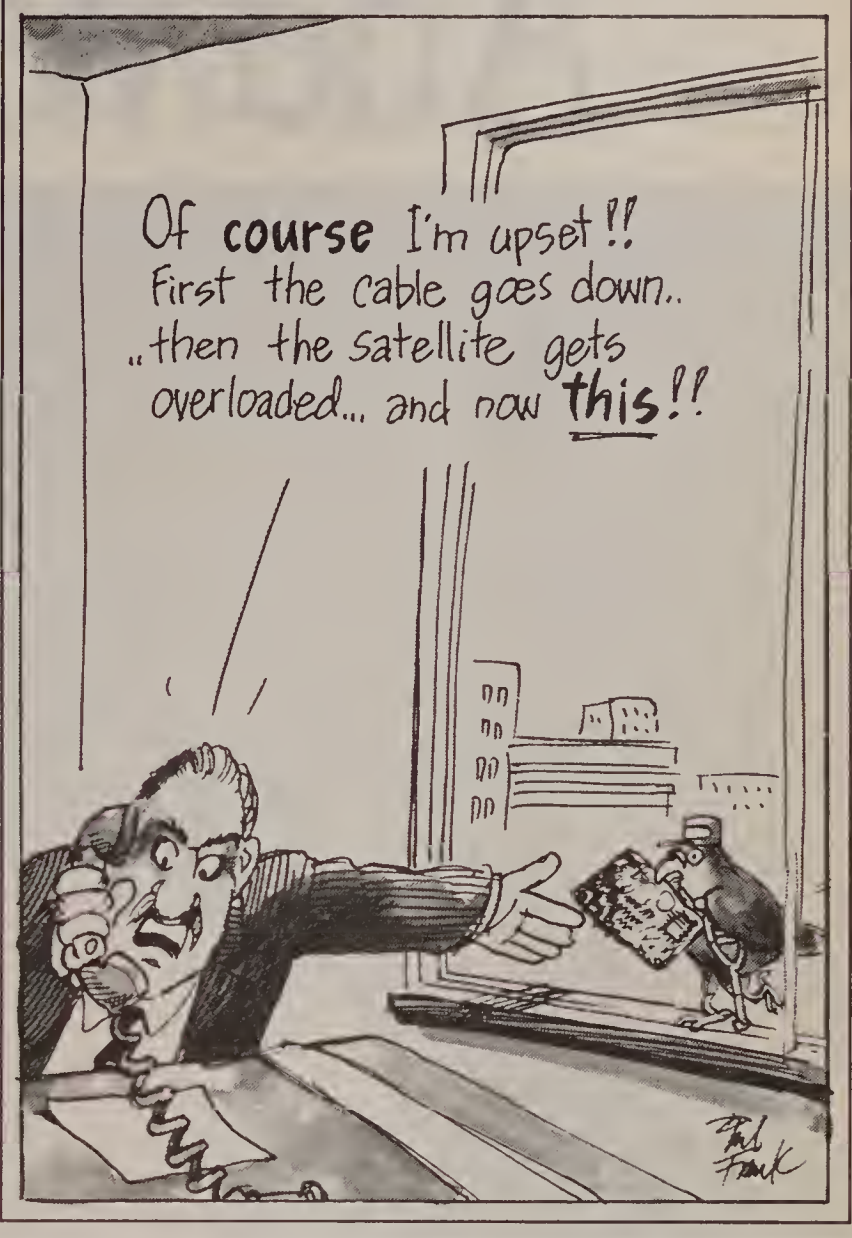
TELETOONS

BY FRANK AND TROISE



LETTERS

Cellular defense

I would like to respond to Mel Mandell's letter to the editor ("More about cellular," *NW,* Feb. 19) concerning my recent Buyer's Guide to cellular services ("Cellular services options merit close user scrutiny," *NW,* Jan. 15).

While Mr. Mandell certainly had a lot to offer concerning cellular services and cellular phones, I think he lost track of what the topic was supposed to be.

The topic was cellular services or cellular hardware. Items such as through-the-glass antennas and golf cart phones are interesting but were not the primary target of the article.

What little mention there was in the article of hardware was merely to provide necessary background information for the services portion of the article.

As far as the two services-related criticisms go, inbound-only service was covered extensively in the associated charts (which, by the way, listed outbound-only, local-only and international dialing restrictions as well). Resellers were not covered because we were already cramped for space with more than 50 licensed cellular providers and more than 360 different services.

Daniel Briere
Principal
TeleChoice, Inc.
Manchester, Conn.

Anything but respectable

I disagree with the contention made in your 900 services Buyer's Guide (*NW,* Feb. 19) that 900 services are "gaining respect in corporate strategies." To me, as both a consumer and producer of information services, 900 numbers practically scream "rip-off."

The problems with 900 services go beyond obvious attempts at exploitation of chil-

(continued on page 57)

Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *161 Worcester Road, Box 9172, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

Closing The Gap Betwe
And What Information

en What Business Needs Systems Can Deliver.

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Going up. . .

By ROBIN LAYLAND
and STEVE SIMON

Users that get in on the ground floor with IBM's Low Entry Networking (LEN) may find their appreciation of the technology rising rapidly. The general reaction of users to LEN, which was implemented in IBM's Systems Network Architecture in 1988, has been positive. And IBM has repeatedly hinted that LEN will be important in the future as SNA moves toward a peer-to-peer networking structure.

However, applications and products that use LEN have been few and far between. And users still have many questions about it: What do you do with it? How do you manage it?

LEN is a combination of two IBM standards — LU 6.2 and Physical Node Type 2.1, also referred to as PU 2.1. Together, these form a peer-to-peer protocol that treats hosts, minicomputers, personal computers and intelligent workstations as equals. LEN allows different devices to communicate with one another directly through an SNA network, rather than communicating only with host applications as it had done in the past. In this way, SNA becomes less of a hierarchical networking structure and more of a distributed networking scheme.

(continued on page 40)

Layland is telecommunications manager and Simon is telecommunications engineering project manager at The Travelers Corp. in Hartford, Conn.

IBM's Low Entry Networking is poised to play an important role in peer-to-peer communications.

The least a local area network can give you is time for lunch.

Some food for thought.

Getting all the information from all your equipment to all your people can occupy all your time.

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Bon appétit.

IBM®

(continued from page 37)

In addition, LEN is not limited to just an SNA subarea network. It can be used as the connection standard within local-area networks between devices that never traverse the SNA subarea network.

Leaving the past behind

By dividing all logical units into two groups — independent and dependent — IBM is emphatically breaking with the past. Dependent logical units rely totally on a host for session services. But independent logical units can start sessions by sending a BIND request to the logical unit with which they want to communicate, without first having to ask the host to start the session.

An independent logical unit can have multiple simultaneous sessions to both the same and different devices, freeing today's powerful workstations from total dependence on large hosts and providing them with greater flexibility. But LEN also introduces new problems in managing this environment.

LEN provides a common interface that ensures successful communications between dissimilar devices — a major step forward from the early days of SNA. The common architecture of LEN allows easier implementation of software across different processors and makes the job of programming for them faster and easier. It also frees the programmer from having to decide which types of SNA devices will be supported, since all devices can implement the common LEN architecture.

The 1980s brought personal computers and powerful workstations to most users' desktops. However, SNA is only now allowing these devices to reach their fullest potential as powerful, independent processors. Cooperative processing, in which several devices share the work load, is not suited to the old SNA structure. LEN enables devices to start sessions as needed to various locations, which is required to unlock the potential of cooperative processing.

> By dividing logical units into groups — independent and dependent — IBM is breaking with the past.
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LEN's power can be illustrated by the following example: Say a salesman, inquiring into the availability of a product for shipment to a customer, finds the necessary information. The salesman now wants a copy of the report on the product, which is in the data base. Instead of using the same session to transmit the report to the printer and waiting until it has been received to continue with inquiries, LEN allows the salesman to start a new session that will receive the report while he continues performing inquiries over the first session.

> LEN is currently implemented in several IBM devices as well as in a family of AT&T products.
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These new sessions can be started dynamically as often as needed and don't have to be predefined. With the old, dependent logical unit architecture of only one session per logical unit, the salesman would have had to stop working while the report was sent down to the workstation.

LEN is currently implemented in several IBM devices as well as in a family of AT&T products. A partial list of IBM processors that use LEN includes the Personal Computer XT and AT and Personal System/2 families running either DOS or OS/2; Reduced Instruction Set Computers with SNA services; and mid-range processors such as the Series/1 and 9370.

A System/38, System/36 or Application System/400 using Advanced Peer-to-Peer Networking can also act as a LEN node to a subarea SNA network. These nodes can be attached either by a Synchronous Data Link Control line or a token ring. AT&T recently announced support for LEN on its 6386 WorkGroup System.

LEN's strength is the functionality and power it provides to workstations. As is the case throughout the history of SNA, functionality has generally preceded manageability. Coping with the increased functionality and power LEN provides is a great challenge for today's SNA net manager.

Some pitfalls

Before the advent of LEN, management information was primarily captured in the host, then processed and stored on the host disk for future reporting. VTAM applications such as CICS or TSO pass inbound and outbound network flows through VTAM buffers. In these buffers, VTAM cap-

See the FAXNeT Form on Page #49

tures message traffic for traces, accounting and performance. This information was passed from VTAM to NetView with very little overhead.

LEN data streams do not always travel to the host. LEN PU 2.1 nodes also have buffers that can capture network-bound messages. In PU 2.1, however, there is no built-in method for capturing messages sent or received, or for capturing accounting and performance data. Even if management data is captured at a PU 2.1 node, writing an application that can merge and format nonstandardized data into a meaningful report is difficult.

IBM's current approach to this problem is to capture management data at the entry point into the subarea network, the Network Control Program (NCP).

> The challenge for the net manager is to find ways to size the network and to monitor resources dynamically.
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This approach moves some of the collecting, merging and synchronization functions out from VTAM and into NCP.

NCP uses its own session with VTAM to send management data, a technique that is effective because it allows a single IBM area to control the collection and reporting functions. The downside is that message traffic is only tracked inside the subarea network. Any problems that occur outside the subarea network will not be addressed.

LEN affects network management information definitions and units of measure. Before LEN, performance was measured by response time. With LEN, response time may not be meaningful because LEN nodes use LU 6.2 rather than the traditional 3270 protocol.

LU 6.2 is used for application-to-application flows, while 3270 was designed to handle terminal-to-application data flows. When the user is an application, rather than a human user, that runs during times of low network load, response time is unimportant. The only concern is whether a file transfer could be accomplished in an allotted time window.

Before, LEN availability was defined by the node being in session with VTAM. But now, LEN nodes do not need to have a session with VTAM to be available to other LEN nodes.

Currently, the lowest level of reporting is for a single logical unit. For example, accounting or performance information could be collected and reported by the logical unit name.

Generally, this logical unit represents a single user's terminal or application.

With LEN, a logical unit can simultaneously run many sessions, possibly even being used by different users. In this case, accounting may need to be done at a session level. Sessions may endure the entire day and can carry many different conversations, each of which could be initiated by different application programs. Performance may be best reported at the conversation level by the transaction program name.

Tools and methods used to manage LEN must be dynamic. Traditionally, flow control and the maximum number of sessions that would travel into a front-end controller were predefined.

With LEN, however, session activation is dynamic and flow control is negotiated between partners. The challenge for the network manager is to find ways to properly size the network and to monitor and control resources dynamically to prevent capacity problems.

LEN nodes need to be predefined in their hosts' VTAM and in the connected NCP. During installation, however, the LEN nodes automatically negotiate most parameters, saving time and effort for the network manager. Also coordinating parameters between session partners requires less time.

(continued on page 43)

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com • pat • i • ble
(kəm pat′ə b′l) ***adj.***
1. capable of getting along well together; in agreement. 2. of c having the ability to communicate with others. 3. that can b **compatibility, com patibleness, comp**

(continued from page 41)

LEN sessions are allocated from session pools in the NCP, which consist of reserved and unreserved control blocks for session management, session anchoring (addresses) and accounting. Before a session can begin, each partner has these control blocks allocated from the NCP pools. If the control blocks are unavailable, the session will fail.

> While LEN calls for a single identifier, this is not supported by several LEN platforms.
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The technique of using a shared pool of control blocks allows more efficient use of storage and frees support staff from individually researching and defining each session. The challenge is that this approach results in a dynamic use of NCP session pools that are predefined in size; therefore, session pools must be properly sized and monitored to ensure an adequate supply of control blocks without consuming excessive NCP resources.

Properly sizing pools requires that the network support staff knows the maximum number of concurrent sessions initiated and received by each LEN node in each NCP, which in most cases is not feasible. Even if these numbers are known, specifying pool sizes requires following a fairly complex set of rules.

For example, session management control blocks are needed for both session partners. Address control blocks must be unique for the session initiator, but the session recipient can use a common address control block for all received sessions.

An alternative technique is to make a best estimate and then monitor pool use. Currently, the only means to accomplish this is for the user to write a program that issues VTAM commands to display NCP storage. Eventually, IBM will need to provide monitoring tools to avoid interrelease incompatibilities.

> The question with problem performance determination is how to measure response.
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Session management

With negotiation taking place between peers, it will become increasingly important to identify peripheral configurations from a centralized site. Session management can provide centralized access to LEN installation and negotiated session information. The NCP uses session information retrieval to report on session information using a network management vector transport flow. NetView can then solicit this data for a specific session. The NetView Session Monitor can provide session configurations, session parameters, route configuration and session errors.

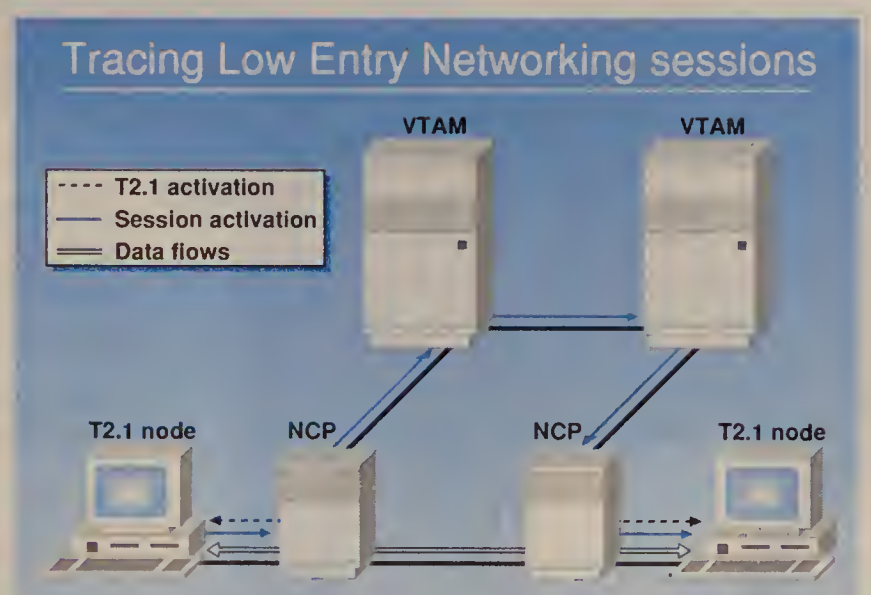
Currently, sessions are tracked at the logical unit level. With parallel sessions between LEN nodes, it is more important to track sessions or even conversations on a session. For example, the user may need to identify a failed or stalled conversation or session to a help desk. Each LEN node, the NCP and host VTAM uses its own set of session identifiers. While IBM's LEN architecture calls for a single session identifier, this is not supported by several LEN platforms, including OS/2 Extended Edition. This will be an impediment during early LEN use.

VTAM currently has no means of tracking conversations between nodes. Only the two PU 2.1 nodes that are having the session uniquely identify conversations. The NetView Session Monitor neither displays these identifiers nor does it provide the transaction program name. This information could be useful in identifying a conversation, and its absence is a shortcoming that has a major impact on problem determination.

Problem determination

Currently, the network manager can trace most activation and session flows using host VTAM buffers. LEN node and session activation flows, however, are distributed on several sessions. For example, suppose two LEN nodes are attached to two different NCPs that are attached to two different VTAMs (see figure, this page). For each LEN node, activation occurs between the PU 2.1 and its NCP. Session initiation uses the PU 2.1-to-NCP sessions and the NCP-to-VTAM sessions to forward session parameters. The VTAM-to-VTAM session locates and verifies that the receiving PU 2.1 node is active. Actual session data messages flow on the PU 2.1-to-PU 2.1 session. The challenge for problem determination is that six sessions must be traced, compared and synchronized.

By capturing flows in the NCP rather than in VTAM buffers, IBM provides a single tool, called a generalized path information unit trace, to capture end-to-end session initiation and data flows. The NCP's trace analysis program can then filter these flows down to the session-reporting level.



The T2.1 nodes are activated by their respective Network Control Programs to send or receive session information. Next, sessions are activated between the Low Entry Networking components, which pass the information to the receiving T2.1 node. Data can then be transmitted between the T2.1 nodes.

GRAPHIC BY SUSAN SLATER SOURCE: THE TRAVELERS CORP., HARTFORD, CONN.

For problem determination at the application level, this will suffice.

However, it does not provide PU 2.1 activation flows or intermediate session activation flows on the NCP-to-VTAM and VTAM-to-VTAM sessions. Some activation flows can only be partially captured in the NCP. Each session requires that separate traces be run simultaneously. Then their outputs must be manually synchronized, which is not only time-consuming but also, in some cases, impossible if time clocks do not match. This is a problem IBM must address in the future.

Another approach to problem determination is to use the alerts that some PU 2.1 nodes can generate by using an optional physical unit-to-VTAM session to report problems. The net manager can use this approach to recycle failing logical units and, with some extra programming, can even restart problem sessions.

Accounting

The NetView Performance Monitor (NPM) captures volume session statistics in VTAM buffers. Because PU 2.1-to-PU 2.1 data flows do not necessarily pass through VTAM buffers, IBM added a new feature called network session accounting (NSA) to NPM. For each monitored logical unit in every session, NSA captures byte and message volumes for send and receive data and control flows. Accounting records are sent from the NCP to an NPM collector at the beginning and end of each session.

Records are also sent at predefined byte or message number thresholds. Accounting records can be written for either session initiators, session receivers or both, which eliminates double accounting. Each session is uniquely identified by its session ID and logical unit partner names, which are stored in the start-accounting record. Every record contains a date and time stamp.

For capacity planning, accounting by logical unit should be adequate. However, charging network use according to a user or application requires that more information, such as user ID and application name, be included in accounting records.

> IBM must incorporate performance monitoring at the conversation level.
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The technique of capturing message volumes in NCP is effective for now, but when PU 2.1 nodes communicate directly with one another, message flows will not pass through either NCP or VTAM. This means that they will not be counted unless the PU 2.1 nodes themselves are involved. IBM should consider adding accounting to the PU 2.1 architecture to make it consistent.

Performance

To manage the network effectively, the network manager needs performance information to aid in capacity planning, service-level evaluation and problem determination — all areas that IBM has not even begun to address.

Within the subarea network, NSA provides adequate message traffic information for capacity planning. But outside the subarea network, NSA is not useful for capacity planning.

The question with problem performance determination and service-level reporting is how to measure response time. Currently, good or bad performance is defined by the effect it has on the end user. If the response time is slow, the user loses productivity. But what effect would bad performance have if the user is an application? In this case, performance might be defined by throughput. How do we measure performance when a single session can have both person-initiated and application-initiated conversations?

Another problem in measuring performance is that if we could get response time information, how could we interpret it? For example, a message leaves a workstation and arrives at a server. How can start and stop times be correlated for this message between end points?

The workstation must initiate a high-priority inquiry followed by a low-priority file transfer on the same session. This is followed by a middle priority electronic mail transaction initiated by the server. The inquiry transaction consists of a single message sent and a single message received. The file-transfer transaction only sends messages, while the E-mail transaction sends and receives short message units.

How can response time be compared if different conversations have different priorities, and the sequence and timing of send and receive flows vary?

The problem is finding how to separate each type of transaction for performance measurement purposes.

IBM has not addressed these problems in its network management products. In the interim, users must try application-specific solutions. IBM must eventually incorporate performance monitoring at the conversation level into its PU 2.1/LU 6.2 architecture.

LEN can be used today to unlock the power of intelligent workstations. LEN allows users to view workstations as equals to the host, not as its slaves, giving them the ability to freely communicate. While management problems with the current implementation of LEN exist, they are tolerable.

IBM still needs to address the problems of LU 6.2 conversation management and accounting, session management, and performance and response-time measurement. The most important reason for investing in LEN today is that LEN frees the workstation to be what it was meant to be.

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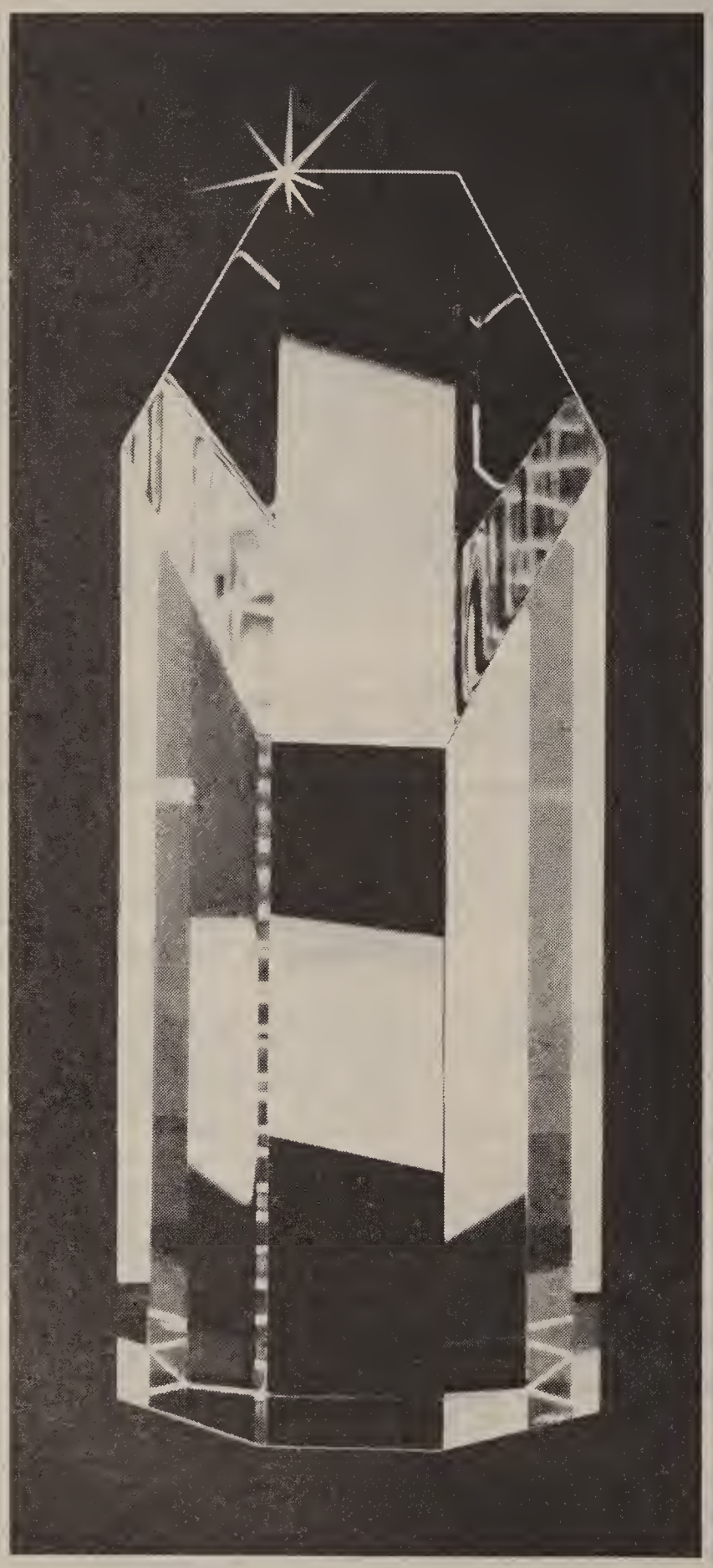

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BUYER'S GUIDE

NETWORK DESIGN SOFTWARE

Network by design

CONTINUED FROM PAGE 1
all kinds of networks, are a great help in this regard.

Starting at the departmental level, a local-area network design package can help optimize the performance of a particular LAN.

Salamone is the features writter for Network World.

CHART • GUIDE

A *Network World* Buyer's Guide chart comparing the features and prices of network design software can be found on page 50.

For corporatewide networking needs, today's design packages allow users to reduce corporate communications costs by keeping abreast of changes in tariffs and rate structures, as well as the competitive pricing options available for long-distance and local access services.

Perhaps more importantly, several users interviewed for this article claim they saved about 10% of their operating costs when they built their nets with the aid of a design tool. One user, Butler Cox, a cabling consultant, used Command, a product from Isicad, Inc., to design the premises wiring for a "large, multinational banking operation."

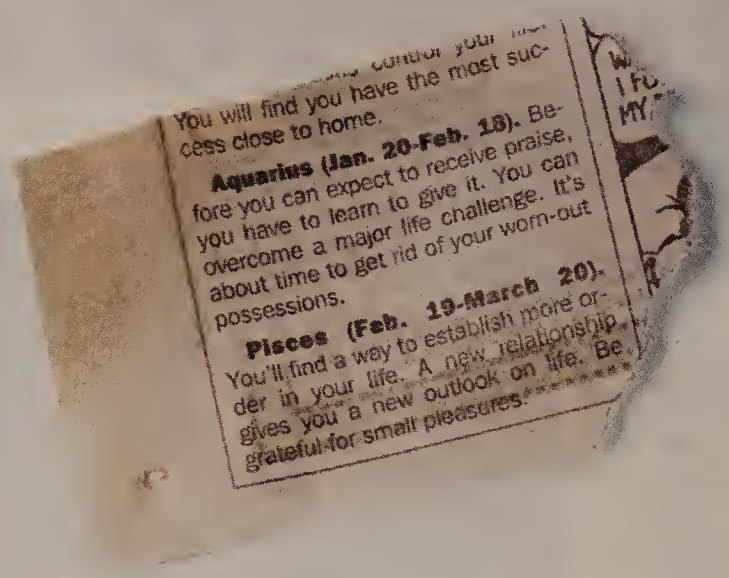
Butler claims using the design tool for the 10-story building saved $60,000 in material costs.

The savings were the result of being able to use the tool to determine accurately the amount of the materials required.

In the cabling industry, materials are traditionally overordered by an average of 10%, Cox says. The reason for such overordering: No one was really sure where the cables were going and what routes they would follow. So they had to have extra cables to be sure they would have enough for the installation. With Command, Cox finds he can order materials accurately to within 2%.

(continued on page 48)

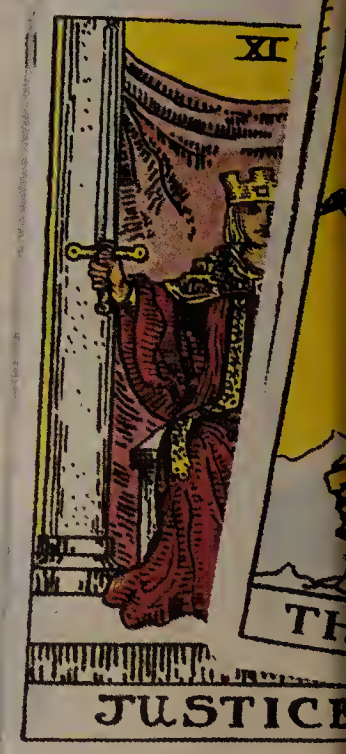
In this post-divestiture world, today's tools can make the challenge of building networks a lot easier.


You will find you have the most success close to home.

Aquarius (Jan. 20-Feb. 18). Before you can expect to receive praise, you have to learn to give it. You can overcome a major life challenge. It's about time to get rid of your worn-out possessions.

Pisces (Feb. 19-March 20). You'll find a way to establish more order in your life. A new relationship gives you a new outlook on life. Be grateful for small pleasures.

Predicting compatibility for Delivering it today is another.



the future is one thing.

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NETWORK WORLD

Network design software

Company	Product	Platform	Operating system	Bundled	Graphics	Features	LAN/WAN	Price
Architecture Technology Corp. Minneapolis (612) 935-2035	Token-Ring Cabling System Planner	PC	DOS	No	Grid system to lay out LAN	Designs PC token-ring nets	LAN	$295
Aries Group, Inc. Rockville, Md. (301) 762-9600	Queue	PC	DOS	No	Various output displays of network configurations	On-line tariff data base, many modules for designing specific components of WANs	WAN	On-line lease arrangement
BGS Systems, Inc. Waltham, Mass. (617) 891-0000	BESTnet Boundary	IBM 30xx, 43xx	MVS	No	Mapping capabilites	Analytic prediction tool for SNA networks	SNA nets	$10,000 to $79,000 (depends on the type of IBM mainframe)
Connections Telecommunications, Inc. Brockton, Mass. (617) 584-8885	NETConnect	PC	DOS	No	Microsoft Corp.'s Microsoft Windows interface	Designs SNA, X.25 and hybrid nets	WAN	$20,500
Digital Communications Associates, Inc. Alpharetta, Ga. (404) 442-4500	Network Resource Planning Tool (offered through Racal-Milgo)	PC, Sun Microsystems, Inc., Racal-Milgo's System 9000	DOS, Unix	Optional	Multiple windows, many mapping display features	Monthly tariff updates	WAN	$65,000 starting price for DOS version; $200,000 for version bundled with Sun workstation (includes one year of monthly tariff updates)
HTL Telemanagement, Ltd. Burtonsville, Md. (800) 225-5485	Private Line Pricer	PC	DOS	No	Reports only	Tariffs data base updated monthly	WAN	$3,500
InternetiX, Inc. Dunkirk, Md. (301) 855-0300	LANSIM	PC	DOS	No	Visual modeling interface, point and shoot	Models LANs at OSI Layers 1-4	LAN	$8,200
ISICAD, Inc. Anaheim, Calif. (714) 533-8910	COMMAND	PRISMA workstation	Unix	Yes	Point-and-shoot CAD system	Full relational data base of net elements	LAN, premises and campus wiring	$50,000
John Bridges & Associates Leisville, Texas (214) 436-8334	HNDS	PC (386-based)	DOS	No	Custom graphics package	Tariffs updated quarterly	WAN	$40,000 first year licensing fee
Make Systems, Inc. Mountain View, Calif. (415) 941-9800	Netool Workbench	Sun	Unix	No	Mapping capabilities	Proprietary algorithms model multiplexers and other equipment from many vendors	WAN	$34,000 starting price, depends on options
Network & Communication Technology, Inc. Park Ridge, N.J. (201) 307-9000	PLANET	PC (386-based)	DOS	No	Graphical depictions of local net design	SQL graphical data base	LAN	$995 for single-user version, $7,995 for multiuser version
Network Design & Analysis Corp. Markham, Ontario (416) 477-9534	AUTONET Designer	PC	DOS	No	Tracks network configuration	Several modules including network optimization and performance evaluation	WAN	$10,000 for first copy, less for additional copies; $30,000 for site license
Network Equipment Technologies, Inc. Redwood City, Calif. (415) 366-4400	Network Design and Analysis System	Sun	Unix	No	Optional color graphics module	Mouse-driven commands and menus	WAN	$50,000
Network Synergies, Inc. Lafayette, Ind. (317) 742-9000	STAR	PC	DOS	No	Mapping capabilities	Tariff data base, allows user to ask "what-if" questions	WAN	$495 to $30,000; varies with the modules and data bases that are selected
Performax Los Altos, Calif. (415) 969-3399	Network Performance Expert	PC	DOS	No	Mapping capabilities	Data performance and analysis	WAN	$4,000
Quintessential Solutions San Diego, Calif. (619) 692-9464	Network Design Module	PC, Sun	DOS, Unix	Optional	Windowing and mapping capabilities	Many modules for different types of nets, tariff data bases available	WAN	$65,000 (for DOS version)
Technotronix McLean, Va. (703) 749-1471	Explicit	PC (at least an AT)	DOS	No	X-Y grid plots of network	Performs performance analysis for SNA networks	SNA nets	$6,000

This chart includes a representative selection of vendors in the network design software market. Vendors may offer other products, and some vendors not included may offer a full range of competitive products. Questions about chart listings should be directed to individual vendors.

NETWORK WORLD CHART

(continued from page 48)

cations engineer with the Mound Applied Technologies Group of EG&G, Inc. in Miamisburg, Ohio. "But there has to be a balance between performance and least cost."

This opinion is seconded by Curtis Gray, cofounder and executive vice-president of Network Synergies, Inc. "You can design a least-cost network, but if it doesn't perform to your expectations or does not meet your communications requirements, it's certainly not a bargain," Gray says.

Users can't install the network first to see how it works. "What you want to do is run some models simulating the network to get some idea of benefits, price differences and different types of performance levels you can realize with different types of equipment," Gray says. "Basically, you want to find out what you can live with and what you can't."

How this simulation is accomplished varies greatly from product to product. At the high end of the market, software design tools such as those offered by Make Systems, Inc., Quintessential Solutions and others focus on the actual execution of network design algorithms, according to Van Norman. "These programs are based on heuristic algorithms. They are fairly complex."

Such programs determine concentrator locations as well as terminal connections to those concentrators.

The programs are based on a minimum spanning tree concept that is part of operations research. "It's a routing problem," Van Norman says. These net design tools are based on queuing algorithms such as the Erland B formula, the Poisson Blocking formula and the Khintchine-Pollozcek formula. Net design tool vendors modify these algorithms, and the new versions become proprietary algorithms.

"The proprietary nature of the programs is in how the statistical models are implemented and applied," Gray says.

Designers need the capability to do some quick what-if analysis. For instance, in design modeling, one needs to take into account the network traffic, the arrival rates — how fast and how often traffic is arriving for each location — in addition to the nuances and overheads of the protocol that the designer has selected.

Typical issues are: If a user has six sites, what response times can be expected if all six are put on a single line? What range of line speeds should be used? What kind of protocols should be used?

Some design tools, such as Network Synergies' Quick*Model, let a user enter a couple of sites and then simply hit a key to get some answers. "You do not need a Ph.D. in operations analysis to use the program," Gray says.

WAN design tools also allow a user to see whether a few more transactions on the network will bring the system down or whether there is room to grow.

With such capabilities, network design tools seem invaluable. Yet while the capabilities of the tools available for network design grow, the market for such products seems to be stagnant. This is evident in the changes the industry has seen in the last year.

For example, Contel Corp.,

(continued on page 52)

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United Kingdom
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Timeplex New Zealand
Wellington
64/4/711/287

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(continued from page 50)
through its subsidiary Contel Customer Support, used to market an extensive set of network design and analysis tools under the product name Modular Interactive Network Design (MIND). However, last year, the company stopped offering the product. The MIND product line is now offered by Network Management, Inc., a Fairfax, Va.-based systems integration and network management firm.

Other companies, such as Telco Research Corp. of Nashville, have stopped offering their products commercially, choosing to use them only as part of their design service to clients. Similarly, BBN Communications Corp. of Cambridge, Mass., only uses its design tool internally as a service to its customers.

With the apparent need for sophisticated design tools, why is the market hurting? "Look at the world of tariffs," says Van Norman. "You have hubless digital data service, fractional T-1, Integrated Services Digital Network services coming on-line, fast packet technology marketed at a different price and switched 56K. All these things are fairly new. They are all changing, and every week, there are new tariff filings.

"If you're a design tool supplier, you have to incorporate this incredibly volatile market of tariff offerings into your tool if you really want to design optimal solutions," Van Norman explains. "Tracking that moving target and constantly incorporating it into your tool is, to be honest, what drove a lot of manufacturers out of the market.

"It's expensive to maintain tariffs, and it's fairly labor-intensive," Van Norman continues. "That's why the cost of maintaining the tools keeps going up. It's hard to keep increasing the price of the tools because you're not getting a lot of takers at the price it is now."

Meeting wiring needs

Some design software enables the designer to look at drawings of the building before laying out the new network. Generally, the building drawings are brought into the system by scanning or by importing drawings from computer-aided design systems. Then the designer can draw communications cable on top of the floor plans.

In these systems, a designer selects symbols for items such as terminals, patch panels, connection blocks, servers and various communications devices from libraries. Design tools that help place the cabling also exist. With such tools, once the premises wiring for a section of the building is complete, the designer can verify the connections simply by pointing to an object in the drawing.

Such software generally handles telephone systems, data communications systems, as well as video communications, fire alarm and security systems. For example, products such as Isicad's Command allow designers to integrate all aspects of building cable plans.

Designing for change

In the facilities world, it's called "churn." In the network management world, it's more often referred to as moves, adds and changes. In either case, it happens a lot.

According to John Kaiser, product manager for communication management products at Isicad, the average churn rate in the U.S. for network equipment, which sometimes includes telephones, is between 30% and 35%, though many banks churn at 100% per year. To help bring about these changes, some tools let users design on the fly.

> Some design software enables the designer to look at drawings of the building before laying out the new network.
>
> ▲▲▲

For example, Command incorporates a relational data base with graphics to help make moves, adds and changes easier. The graphics and data base work together, displaying the physical locations of these devices on a floor plan, as well as showing the units' connectivity.

Built into the data base are the manufacturer, model number, cost, power requirement, structural loading requirement and HVAC requirements to keep the device cool. Additionally, local information such as the maintenance history of a terminal on the network can be incorporated to describe each device.

Net design tool trends

The design world is increasing in complexity just because of the number of variables involved, such as the tariff structures and equipment options. You can see some fairly dramatic cost swings with some choices.

It used to be that long distance was expensive and local access was cheap. But in the past few years, the cost of long distance has decreased while local access prices have increased. Vendors now offer to put equipment such as multiplexers at point-of-presence locations, rather than at the user's facility. This practice, known as collocating, increases the number of options considerably.

The network designer faces many

(continued on page 57)

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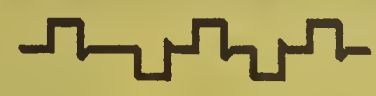

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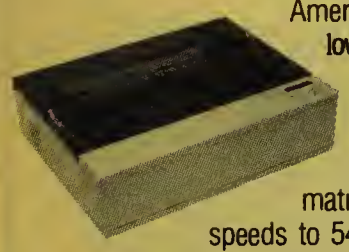

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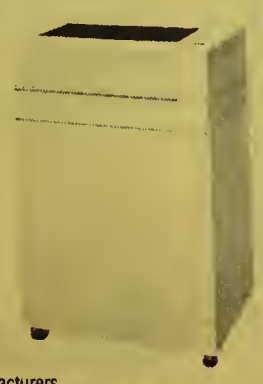

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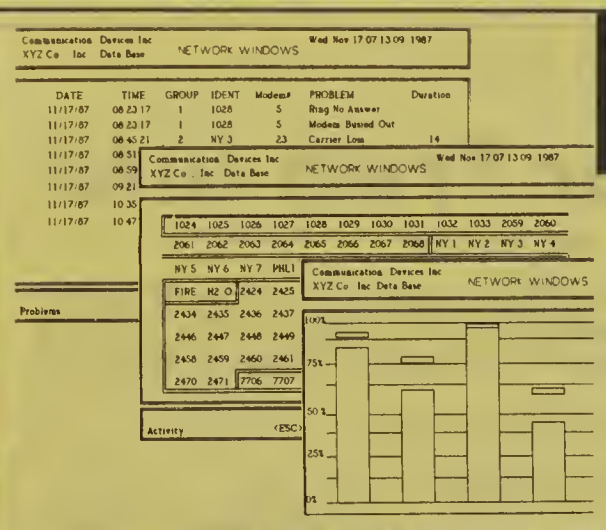

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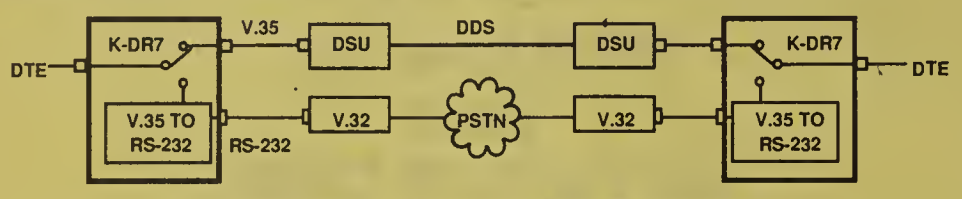

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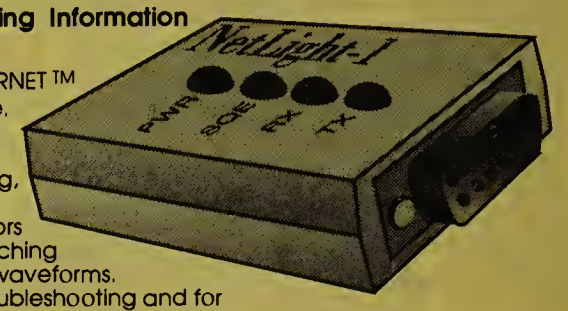

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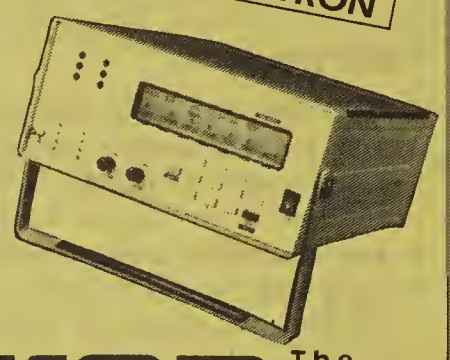

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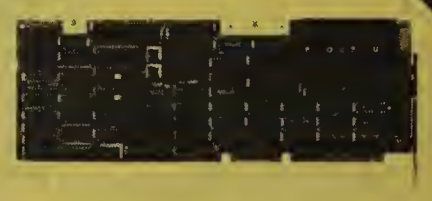

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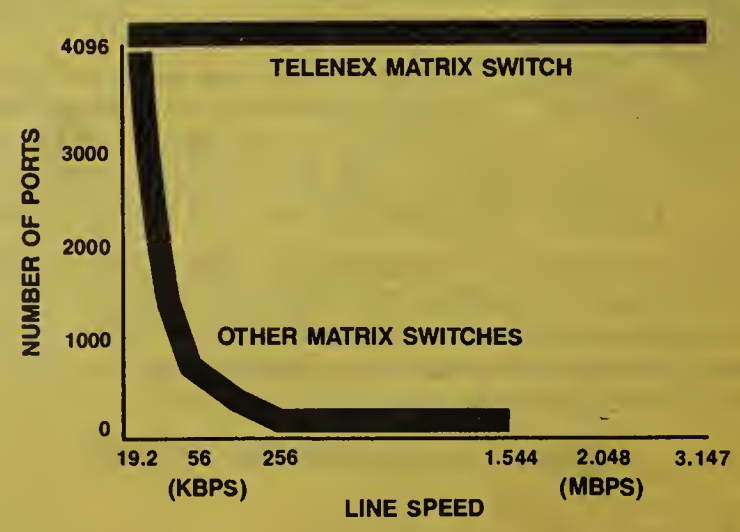

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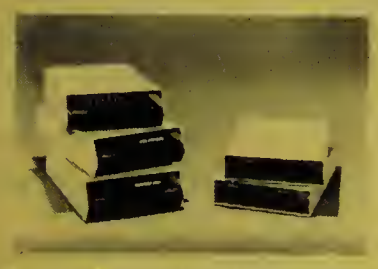

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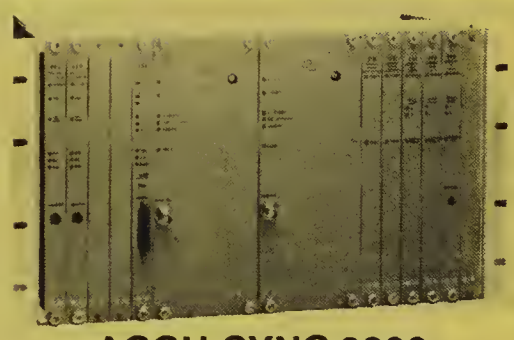

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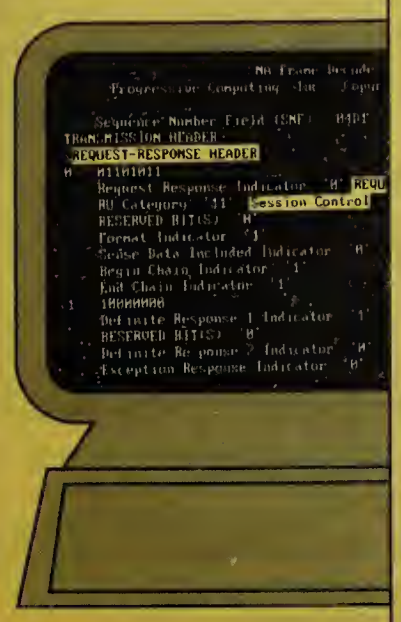

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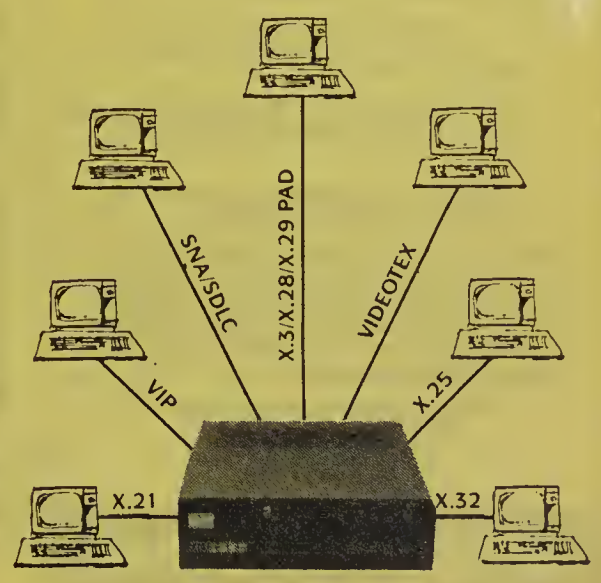

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May 28 - Network World/Infonetics LAN Test Series: Use Of LAN Analyzers To Detect Interoperability Problems - Harvey Ad Study

June 4 - LAN Buyer's Guide: LAN DBMS Software - Bonus Distribution: Comdex Spring

June 11 - Datacom Services Buyer's Guide: Switched Data Services

June 18 - Network World/Infonetics LAN Test Series: Bridging Ethernet & Token Ring Networks

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(continued from page 52)
choices. Design tools basically are used to cull options that may not make sense, either economically or performance-wise.

The trend in network design software is for the tool to be as user friendly as possible while still offering flexibility and a high degree of sophistication for the network virtuoso.

Versatility is key

The tools should allow relatively inexperienced users to design sophisticated networks and, at the same time, give network artisans the ability to create, relieving them of some of the more tedious tasks such as record keeping. Expert systems would be particularly useful in the area of tariffs because many options come out each day.

One area that network design tools are already addressing is the interface of net design tools with network management systems.

"You want to be able to grab empirical network data from the network and say, 'OK, I want to interface into my network design tool,' " Gray says.

Such systems allow the designer to gather empirical network traffic data on a snapshot basis once a day, then build and use files based on that data to perform trend analysis with the design tool. The designer could use this information to make predictions about the system's performance.

For example, one might find that according to network traffic growth trends, certain areas of the network will be overloaded within six months. This information could be used in the budgeting process, according to Gray.

"I could go to my budgeting committee and show them data from the network, our level of growth and the projection," Gray says. "Then I could tell them we are going to need upgrading or downgrading in these areas, or maybe we should be looking at a different architecture." This method allows the net manager to be on fairly solid ground, instead of saying, "We've done some analysis" or "I feel . . ."

In summary, network design tools allow the net manager to be proactive, rather than reactive. According to Gray, "You don't want to wait until the users are beating on the Enter keys, waiting 20 or 30 seconds for a response, before you start to consider system capacity."

Letters

continued from page 33

dren. If I want to purchase a product or service via telephone, I can dial either a toll or toll-free number and use a conventional credit card. Not only does this probably cost the vendor less, but it also gives me the opportunity to find out more information about a product or service before agreeing to purchase it.

I think that this is the crux of the matter. Dialing a 900 number automatically commits the caller to the purchase.

Beyond the consumer-oriented information products, such as weather reports and sports scores (information that can usually be obtained from other sources for much less money), what is the utility of 900 services in the corporate world?

If a legitimate business wants to offer a product or service, why not simply bill the caller directly or via credit card?

As a method of customer support, 900 numbers create a decidedly negative image of a company. The only purpose that I can see for 900 numbers is to force the purchaser into spending money impulsively. There is little or no recourse for the customer to say "No, thank you" before being charged for the product or service, and this in itself makes 900 service — no matter how legitimate — suspect.

The bad reputation that 900 numbers have is well deserved. Other, more economical means of providing telemarketing and information services — ones that do not reek of exploitation — exist. I think it behooves any legitimate company to take a good look at what the institution of 900 services says about the company and its attitude toward its customers.

Evan Provisor
President and
chief executive officer
Epsoft Computer Systems
Sharon, Conn.

Upgrade of U.K. node lets AT&T reach out

continued from page 25

knowledge no other carrier currently offers a store-and-forward facsimile service in the country.

The messaging node enhancements will also enable AT&T to supply such things as telex-to-facsimile conversions in the U.K. Goldstein said AT&T could also begin offering a service in the U.K. in which users could have their electronic messages read to them over the telephone via computer-synthesized speech, a service currently available in the U.S.

"It gives us the ability to do a wide range of things that previously we could only do in the states," Goldstein said.

By forming AT&T Istel Global Messaging Services, Goldstein said AT&T will be able to work closer with Istel in supplying network services to users.

More about Istel

Istel supplies a range of network services in Europe, including an EDI transmission and translation service called Edict, and transmission of computer reservation traffic between national computer reservation systems and travel agencies.

About 100 people have been taken from AT&T and Istel to form the company, which will market AT&T's and Istel's network services in Europe.

"It's really the first fruits of the acquisition," Goldstein said. Istel employs about 2,000 people.

Dictionary fills void in industry

continued from page 23

its comprehensive survey of terms. *Newton's Telecom Dictionary* provides the reader with a comfortable balance of definitions, including a wide mix of basic electronics (ohms, capacitance and inductance), regulatory subjects (U.S. District Court Judge Harold Greene and the Federal Communications Commission) and a reasonable devotion of space to voice, data, local-area network, video and satellite products, services and features.

As for the drawbacks, most could be solved with a stronger attention to editing. This work has a number of typographical errors, as well as some factual mistakes that need attention. Newton's stylistic self indulgence and biases also tend to blunt his credibility.

Some acronyms are simply spelled out with no further explanation, for example, "TARGA: Truevision Advanced Raster Graphics Adapter." In other definitions, the book similarly fails to clarify an abbreviation. For instance, under the definition for PU, the author correctly identifies it as a Systems Network Architecture component that manages a network node's resources, but he leaves out the fact that PU stands for physical unit.

Other irritating mistakes — or misprints — indicate that a mile is 5,270 feet (instead of 5,280 feet) and that Ka-band satellites work in the 17- to 31-Hz bandwidth (instead of 17 to 31 GHz).

The author also appears to be biased toward defining AT&T products and services without balancing entries from the competition. One will find entries on AT&T services such as ProWATS, Readyline and Software-Defined Network, as well as the System 25 private branch exchange. There are no references, however, to analogous products and services from AT&T's competitors. Despite these, *Newton's Telecom Dictionary* is a solid help to the telecommunications novice, a handy reference for the seasoned professional and a sound platform for future editions.

The author also appears to be biased toward defining AT&T products and services without balancing entries from the competition.

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Users asking more of T-1 multiplexers

continued from page 19

failure," he said. "In the case of data, you'd like to rely on your T-1 network to do a lot of the alternate routing." Alternate routing enables users to automatically route data from failed T-1 circuits to backup circuits.

Network management plays an even more important role as users connect LANs over T-1 backbones. T-1 vendors are teaming with LAN bridge and router vendors to integrate management of bridges and routers into T-1 network management systems.

Network Equipment Technologies, Inc. and cisco Systems, Inc. have already struck an agreement to integrate their products. Likewise, Newbridge Networks Corp. and Wellfleet Communications, Inc. are doing the same, the report said.

Additionally, as users add high-bandwidth applications to the backbone, they are requiring vendors to provide a 45M bit/sec T-3 multiplexer that will be compatible with existing T-1 equipment, Harrison said. For example, users want T-3 multiplexers that can use the same interface boards as existing T-1 multiplexers. This will obviate the need for users to support two distinct multiplexer architectures in the backbone network.

ATTENTION

California Network Managers

Network Management Solutions (NMS), the industry's premier network management conference, is coming to California April 10-12 at the Anaheim Hilton Hotel.

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Gary J. Beach
President/Publisher
Network World

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See the FAXNeT Form on Page #49

Wang plans to sell InteCom

continued from page 2

between $30 million and $50 million.

Wang bought InteCom, which has about 350 customers and an installed base of about 700,000 PBX lines, for $156 million in 1986, but later decided the company no longer fit into its strategic plans.

The agreement with Matra Communication is expected to be completed by April. InteCom, which said it sold $75 million worth of PBXs last year, broke the news to its customers, employees and distributors last week.

"We were waiting to hear something like this simply because I don't think InteCom could have survived much longer with Wang," said Mark Carpenter, associate engineer within the Communication Systems Division at Duke Power Co. in Charlotte, N.C. Duke Power uses an InteCom Integrated Business Exchange S/80 as its hub PBX and has been delaying buying decisions in anticipation of InteCom's sale, he said.

> "We view this as a positive move because the size of Matra should improve InteCom R&D."
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"InteCom was a very technology-oriented, innovative company when we first bought a switch from them back around 1982, but we felt InteCom wasn't advancing as quickly as they had," Carpenter said. "We view this as a very positive move because the size of Matra should improve InteCom's R&D funding."

According to industry sources, Matra Communication last year spent about 14% of its revenue on research and development, an unusually large portion.

InteCom and Matra Communication make a good match, Mayer said. The acquisition should help InteCom gain a bigger presence overseas and help Matra Communication, which claims to be France's second largest telecommunications supplier, crack the U.S. market, he said.

While details have yet to be worked out, "there are many marketing and product development integration opportunities" to be exploited by the companies, an InteCom spokeswoman said.

InteCom, which attracted users in the early 1980s by unveiling the industry's first integrated voice/data PBX, never fit well with Wang, analysts said.

"The Wang/InteCom deal was nearly a clone of the failed IBM/Rolm deal," said Steve Kropper, program manager for the Integrated Services Digital Network and Intelligent Networks service at International Data Corp., a market research firm in Framingham, Mass. "Neither deal worked when PBX prices collapsed."

For Wang and its users, the sale was good news, analysts said.

"Things look a lot brighter at Wang," said Casey Stern, senior vice-president at Altman Brenner Wasserman, a New York-based securities firm. "It's not just that Wang is lessening its debt, but running this company has been costing Wang money. It was a bad purchase."

It is unlikely that InteCom and Wang will work very closely together to integrate their product lines once the deal is completed, Mayer said. There has not been as much work done in this area up until now as was first anticipated, he said.

Wang officially put InteCom up for sale in September 1989. But sources close to InteCom said that Mayer was told about Wang's intentions to sell the subsidiary in December 1988.

The sale is expected to lessen Wang's debt to about $93 million, analysts said. Wang reported having about $575 million in debt last August.

Law firm plans T-1 net

continued from page 6

sec digital data service lines and over the Telenet X.25 network. "The cost of packet switching this year will exceed the cost of fractional T-1," he said.

Each of the offices will be outfitted with a T-1 multiplexer from CASE/Datatel, Inc. that supports a variety of synchronous and asynchronous data interfaces.

The multiplexers will support transmission of Ethernet and Arcnet local-area network traffic channeled through Retix Ethernet bridges in each office to remote LANs. The multiplexers will also support synchronous traffic generated by Data General Corp. minicomputers at several sites.

The network will give end users, who are typically on Intel Corp. 80286- or 80386-based personal computers, access to data on litigation support systems stored on Eclipse MV/20000 minicomputers here.

In the past, the company had to route bulk file-transfer traffic between the DG minicomputers over the packet network, while all asynchronous terminal traffic required separate 9.6K bit/sec leased lines, Cartier said.

"Now we can have async terminals just go across the WAN and hook up easily to our DG minis," Cartier explained. "We can also have the DG minis talk to PC servers, and we can have server-to-server communications."

Texas hospital tests HDTV net

continued from page 4

mote consultations, Wallace said. HDTV will enable specialists to more accurately evaluate patient symptoms such pupil dilation, and skin color and texture, he said.

The Center for Remote Medical Consultation, which will receive technical assistance from Southwestern Bell Telephone Co., will research and demonstrate remote medical consultation and other medical technologies, such as teleradiology and telepathology. Teleradiology and telepathology involve the transmission of radiological images and pathology slides, respectively, to remote sites.

The center also will be used for direct patient care at the hospital. According to Robert Trottmann, health care industry analyst at Southwestern Bell, that will make it the first commercial application of HDTV in the U.S.

In the demonstration, a neurologist at Texas Children's, which is located in downtown Houston, was able to examine the condition of a 12-year-old female patient who had been suffering from seizures and was on medication.

The patient was accompanied by a referring physician and both were present at a makeshift clinic created at a Southwestern Bell office six miles from Texas Children's.

During the "examination," the neurologist, with help from the attending physician and close-up video shots taken by cameramen, checked the dilation of the patient's eyes, observed her reflexes and examined lesions on her skin. The neurologist concluded that the medication the referring physician had prescribed was correct.

> To contrast the quality of HDTV with regular television, both the clinic and the television studio at Texas Children's were outfitted with HDTV and regular television monitors.
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To contrast the quality of HDTV with regular television, both the clinic and the television studio at Texas Children's were outfitted with HDTV and regular television monitors.

The HDTV camera at the clinic was connected to three coder/decoders. These codecs transmitted the blue, green and red signals generated by the camera across three fiber lines provided by Southwestern Bell to corresponding codecs at Texas Children's. Codecs change video signals into digital format for transmission across fiber lines.

According to Myron Keller, area manager of technology and planning at Southwestern Bell, the demonstration used uncompressed HDTV signals that consumed 2.4G bit/sec of total bandwidth.

Southwestern Bell hired Bell Communications Research, the research arm for the regional Bell holding companies, to coordinate the project because of their expertise with HDTV, Trottmann said. Sony Corp. provided the video cameras and Grass Valley Group, Inc., a video and terminal equipment supplier in Grass Valley, Calif., provided the HDTV codecs.

Although the exhibit was an important demonstration of the technology, there are two major obstacles that need to be overcome before remote consultation via HDTV becomes widely available, Keller said.

The industry needs low-cost codecs capable of compressing HDTV signals onto a single fiber, reducing equipment costs and line charges.

Secondly, the industry needs small, low-cost, broadband optical cross-connect switches supporting eight or 16 ports. Small optical switches would enable organizations, such as a hospital, to support HDTV links to multiple sites without having to establish a direct fiber link to each, Keller said.

LECs step up use of fiber

continued from page 13

optics in their networks at a significant pace last year. The RBHCs collectively increased fiber mileage by 30%. Four major independent local carriers — Contel Telephone Co., GTE Telephone Co., Rural Telephone Co. and United Telecommunications, Inc. — increased fiber installation by 32%. Much of the fiber installed by local companies was in the subscriber loop, which in some cases took fiber all the way to businesses and residences.

BellSouth Corp. leads the RBHCs with the highest amount of fiber in the subscriber loop, with 242,550 fiber miles. Bell Atlantic Corp. has the second highest amount with 163,918 fiber miles, although Southwestern Bell Corp. is close behind with 163,687 fiber miles.

BellSouth conducted eight trials with fiber in the local loop last year, Bell Atlantic had two trials, and Southwestern Bell conducted three trials. US West, Inc. has installed 112,373 miles of fiber in the subscriber loop, Nynex Corp. has 80,480 fiber miles, Ameritech has 67,900 fiber miles, and Pacific Telesis Group has 33,649 fiber miles.

Alternative local carriers, which deploy fiber networks in business districts of major metropolitan areas, were the most aggressive group installing fiber last year.

Metropolitan Fiber Systems, Inc. (MFS), which has networks in eight cities, increased its fiber miles by 760% last year. This pace is likely to continue in 1990 since the company has announced plans to have networks completed in four new cities by the end of the year.

> Alternative local carriers were the most aggressive group installing fiber last year.
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MFS has also petitioned the FCC to expand its services portfolio to offer switched access as well as the tie lines and private-line access it offers today.

Teleport Communications Group, which began in New York, recently completed a network in Boston and is building facilities in Houston, Los Angeles and San Francisco. These expansion plans caused the company to step up installation of fiber by 120% last year.

Another alternative provider, Institutional Communications Co., which has been serving the business district of Washington, D.C. since 1986, increased fiber installation by 24% last year.

Even though the alternative providers installed significant amounts of fiber last year, the FCC report concluded that the impact of these firms on the business of the mammoth RBHC networks was minimal.

It points out that the smaller firms can serve only a limited number of customers — those in buildings tied to the fiber plant — and that, in some cases, the carriers are customers of the RBHCs because they purchase their lines for backup.

What impact there has been, the FCC report said, has been positive for users. "Urban fiber systems may have motivated local telephone companies to price special access closer to cost" and prompted them to install fiber loops to compete for the business of corporate customers.

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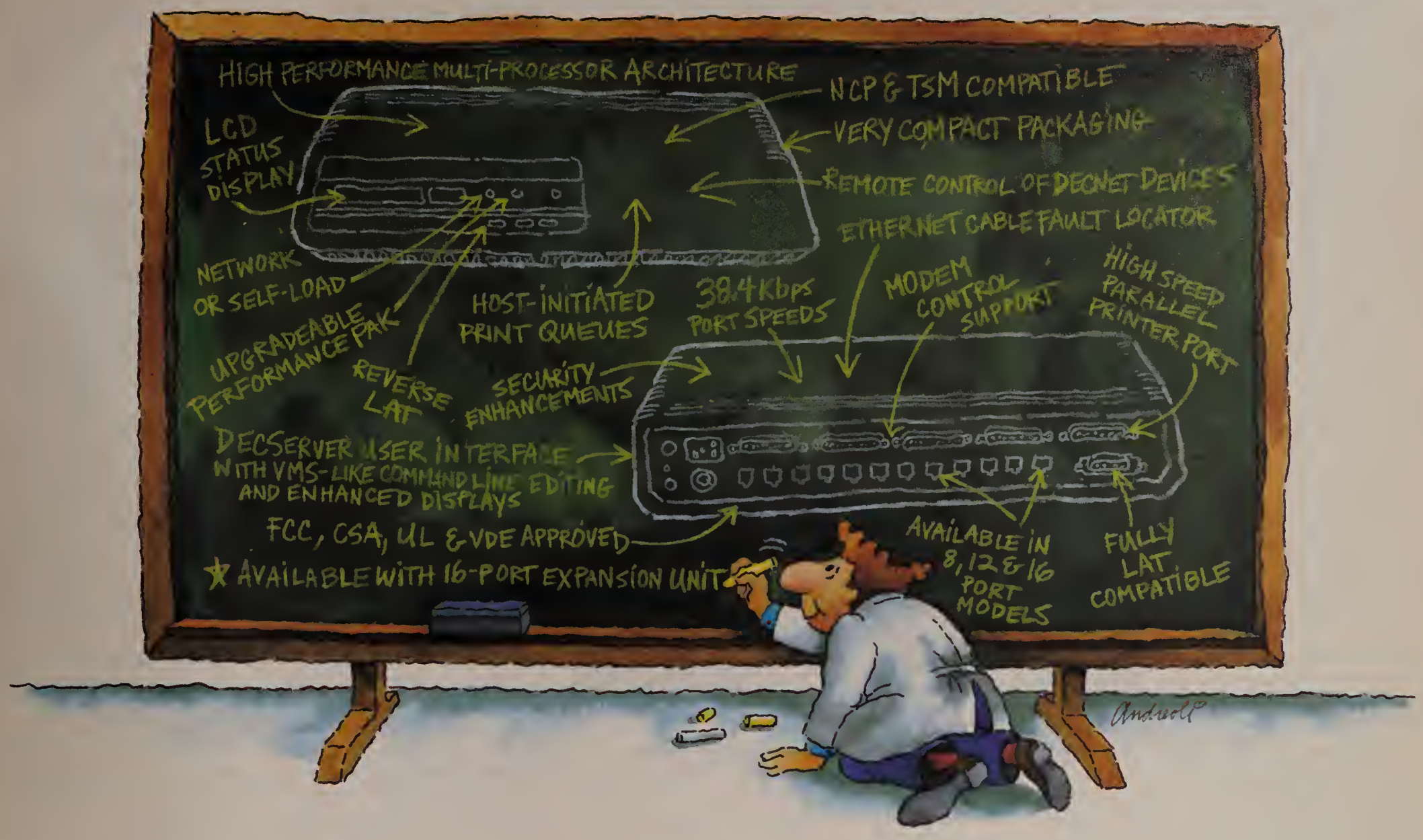

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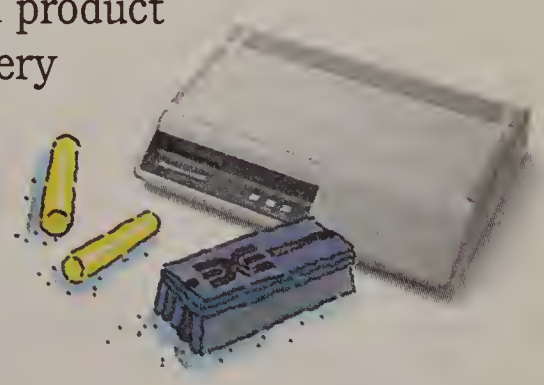

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See the FAXNeT Form on Page #49

Net manages chain as one store

continued from page 1

the company's headquarters, distribution centers and stores.

The network serves the vital role of controlling Wal-Mart's inventory by supporting everything from tracking sales at individual stores via checkout line scanners to supporting electronic data interchange and related "quick response" replenishing techniques with suppliers. It also helps steer goods from Wal-Mart's 17 distribution centers to its 1,500 stores and wholesale centers.

In addition, the $20 million Hughes Network Systems, Inc. VSAT net carries two-way voice traffic and one-way video communications, which Wal-Mart Chairman Sam Walton and other company executives use to broadcast instructional meetings and pep talks. The net also supports a long list of data applications, including credit card authorizations and electronic mail.

Overall, the network promotes open communications at Wal-Mart. The multidomain nature of the retailer's IBM Systems Network Architecture net, which is managed via a Cincom Systems, Inc. Net/Master system here, lets users run transactions at any network processor.

"What we have is almost an endless loop," said Bob Martin, Wal-Mart's senior vice-president of IS. "We've tied our store-level computer system to our distribution center systems and both of them are linked integrally to our corporate systems."

Wal-Mart's mainframes here can trigger events in the company's distribution centers via the net using IBM's LU 6.2 application-to-application communications protocol, Schmidt said. "The network puts the entire chain under a logical roof so we're like one big store," he said.

Coordinating Wal-Mart's flow of inventory helps to hold down expenses and keep shelves stocked with the merchandise customers want, not just the goods Wal-Mart wants to sell them, Schmidt said.

The process typically begins in the store, where an employee scans a shelf label with a hand-held terminal that accesses via radio an in-store inventory system.

The satellite network hub at Wal-Mart's headquarters.

If stock needs to be replenished, the employee can use the hand-held device to send an order to the corporate merchandise system here. The thousands of daily orders are compiled and Wal-Mart issues them in batch to suppliers via EDI. The suppliers fill the orders and send advance shipping notices to Wal-Mart's distribution centers.

If the merchandise is recognized as warehouse goods, a bar-coded pallet tag is generated that helps workers know where to slot the merchandise for later use.

Merchandise intended to be routed immediately to a store is marked with a bar code that identifies it as such, and an automated conveyer belt system directs the material to the right shipping door, Martin said.

The goods are then loaded onto one of Wal-Mart's trucks, and notification is sent electronically to the stores to let them know what is coming. When the goods arrive at the stores, they are scanned and posted in the store's inventory system.

While this process can take up to seven days, Schmidt said Wal-Mart's use of quick response technology is helping to significantly reduce that time to a day or two.

Of Wal-Mart's 5,000 suppliers, 1,900 of them interact with the company via EDI and a smaller subset participates in quick response activities, Schmidt said.

Quick response technology provides for automated reordering of "high-velocity" merchandise, such as paper towels, he said.

As a result of quick response taking care of day-in, day-out types of goods, department managers can focus on "those undiscovered items that people are going to get excited over," he said.

IBM adds 3174 controller

continued from page 2

shunning the larger IBM configuration for cheaper microcomputer-based gateways, according to Ellen Zach, market planner with IBM's Communication Systems.

At $5,507, TokenWay 3174 is roughly 50% less expensive than the previous 3174 gateway configuration. Additionally, it costs roughly the same as third-party products consisting of an IBM Personal Computer configured with Token-Ring-to-host gateway software and is less expensive than a Personal System/2 running gateway software.

TokenWay can support a variety of Token-Ring-attached devices, including larger 3174 controllers, IBM Personal Computers or PS/2s running 3270 emulation software, and Application System/400 minicomputers running software that makes attached 5250 terminals appear to a mainframe as 3270 terminals.

Because it uses the same architecture as 3174s that link remote terminals to hosts, TokenWay 3174 will be easy for MIS personnel to install and maintain, Zach said. "This is the baby brother of the bigger 3174s," she said. "It runs in exactly the same way."

Analysts say the announcement proves IBM is starting to realize the growing need to connect LANs to hosts.

"IBM to date has not had a good LAN-to-WAN gateway," said Dale Kutnick, managing director of the META Group, a consulting firm in Westport, Conn. "One thing the 3174 does well is direct traffic to an IBM mainframe. It does that better than a PC gateway can."

IBM's 3174s, Kutnick said, are engineered specifically to transmit data from remote devices to hosts, which is one reason MIS personnel would rather use a 3174-based gateway instead of a microcomputer-based gateway. Because software developers must write code that forces microcomputers to accomplish that same task, microcomputer-based gateways cannot match the 3174's performance.

With TokenWay 3174, IBM's NetView can view each Token-Ring-attached device as a PU 2 and thus receive hardware fault alerts from Token-Ring devices.

TokenWay 3174 runs 3174 Configuration Support-B Release 2 software, which was announced in May 1989 and will be delivered in May 1990. This software is, in essence, the operating system for the controller.

Priced at $5,250, TokenWay 3174 comes with 2M bytes of memory and either an RS-232 or V.35 physical interface that connects the unit to a modem or a channel service unit/data service unit and network circuit. It requires Configuration Support-B Release 2 software, which costs $257. The hardware and software will be available in May.

In-house tool helps retailer

continued from page 1

tion sponsored by The Institute of Management Sciences. The competition, scheduled for May 6 in Las Vegas, recognizes achievement in the use of scientific principles to solve management problems.

The other authors of the model are Phil Quinn, senior operations research analyst at L.L. Bean, and Henry Parsons, an associate professor of operations management at the University of Southern Maine.

To minimize overall costs, the mathematical computer model calculates the optimal combination of three resources used in the firm's inbound telemarketing operation.

These resources, or variables, are inbound 800 trunks, customer service agents and queue capacity for inbound calling. The model is sophisticated enough to adjust these variables on a half-hour basis in response to predetermined customer calling patterns and other conditions.

Each of the variables has associated costs that the model weighs in determining the optimal combination of resources. For example, the number of trunk lines affects trunk installation charges, usage charges and monthly maintenance costs.

The number of agents affects the payroll, recruiting budget, training costs and the number of workstations the company must support. The queue setting affects the toll charges L.L. Bean pays for customers who are kept on the line while they wait for an available agent.

In essence, the model balances the cost of certain resources — agents and trunks — against the sum of queueing costs and the cost of lost orders.

In L.L. Bean's case, the model showed that the firm should increase its number of agents and trunk lines. This would allow more callers to get through and place orders, thereby reducing the firm's queue costs because callers wouldn't have to wait on hold as long. The resulting increase in revenue was shown to more than offset the total costs of more trunk lines and agents.

As a result of the model, L.L. Bean added almost 100 trunk lines and 260 agents. The company now supports a total of 576 trunk lines and 1,275 agents during peak buying periods at its two calling centers. In return, the company is logging more orders, answering customer calls faster and generating more revenue.

"The model had a nice outcome," Andrews said. "It said 'be nicer to customers and you'll make more money.' "

Customer service shopping

L.L. Bean called on Andrews, Quinn and Parsons when a general consensus arose at the company that telemarketing inefficiencies were losing the company millions of dollars in potential sales. Research by the three men revealed that at certain peak call-in times, 80% of all customers received busy signals and those who got through waited up to 10 minutes for an available service agent.

They also determined that on exceptionally busy days, L.L. Bean was losing as much as $500,000 in unplaced orders because callers either couldn't get through or abandoned the call. Moreover, by keeping customers on hold, L.L. Bean was paying as much as $25,000 a day in extra line charges.

"It was a horrible situation, worse than most people thought," Andrews said.

Prior to this, L.L. Bean tried to optimize the allocation of each telemarketing resource separately, instead of as interrelated pieces, Andrews said. To correct the problem, the team went shopping for an analytical model that would help them optimize everything from lines to agent scheduling.

But the best they could find were models that optimized a piece of the telemarketing operation, such as agent staffing or queue capacity, or simulated the environment in a nonmathematical manner that made it difficult to optimize the variables.

"We would have begged, borrowed or stolen an existing model that met our needs, rather than invent one ourselves," Andrews said.

Plotting the model

But that's what they did.

The team started by gathering empirical data about L.L. Bean's calling volumes and traffic statistics for a three-week period in 1988. This enabled them to determine call volumes for every half hour and the average length of calls. These figures were then translated into actual costs.

The team also recruited AT&T Bell Laboratories to analyze L.L. Bean's inbound calling traffic to determine the percentage of callers who redial the number after waiting on hold and abandoning the call. The statistics revealed a lower percentage of customers tried again than L.L. Bean's management presumed. This shot a hole through management's notion that customers would always call back.

The team included this empirical data in its mathematical queueing model to get an accurate readout of the optimum combination of telemarketing resources the firm should employ.

The results have made a significant impact on the way L.L. Bean views the allocation of telecommunications resources, Andrews said. The model has persuaded the company's management to increase its spending on resources, even in the face of a softening retail market.

WILL YOUR COMMUNICATION SYSTEM
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BECAUSE YOUR NETWORK ISN'T UP TO WORLD STANDARDS?

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WHEN USERS DEMAND IT?

**To know for sure,
you'd need a time machine...**

FCC to relax AT&T regulation

continued from page 1

released for several weeks, some details of two FCC proposals — one dealing with custom network packages and one targeted at a range of business services — were outlined at a hearing here.

The proposals are intended to quell AT&T's complaint that current regulation hampers its ability to meet customer demands.

The first FCC proposal, which includes multiple options, is devised to give AT&T almost complete carte blanche in negotiating network deals such as those offered under Tariffs 12, 15 and 16.

One option is to allow AT&T to offer custom networks under private contracts. Instead of filing a tariff for approval, AT&T could negotiate deals and file the contracts 30 days after they become effective. The FCC would then release a summary of the "pertinent provisions" as a safeguard against AT&T offering select customers special deals.

The second option would allow AT&T to offer custom network deals as non-common carrier services, meaning AT&T could offer custom deals without filing a tariff or a contract ("FCC weighs plan to ease rules on AT&T," *NW,* Feb. 26).

The FCC also suggested declaring AT&T a nondominant carrier and treating it under the same regulatory rules as its major competitors. This proposal, which would completely deregulate AT&T, was viewed as having virtually no chance of approval because of AT&T's dominant market share for several services.

Legal quagmire

Although FCC officials expressed enthusiasm about the changes, attorneys said there are significant legal hurdles.

For years, the FCC and a number of carriers have been arguing about whether it is legal for carriers to offer exclusive deals to specific customers since these types of deals could unfairly discriminate among customers. Opponents said the private contract idea raises the same problem.

Declaring custom networks as non-common carrier services also raises concerns, opponents say. Since custom networks are generally packages of existing tariffed services, it is unclear how they could be judged as common carrier in one instance and non-common carrier in another.

The second major proposal the FCC issued would significantly relax regulation of almost all AT&T business services, including Software-Defined Network, WATS, Pro America, Megacom, voice-grade private lines, wideband private lines (including T-1), switched business services, and Tariffs 12, 15 and 16.

Today, AT&T must give the FCC either 14- or 45-days notice to offer new services or change rates, depending if the new prices meet the price cap restrictions.

Under the proposed changes, AT&T would be able to add features, introduce new services or change prices by giving the FCC notice just one day in advance of offering them to customers. US Sprint and MCI must file such changes on 14-days notice.

FCC tweaks price cap plan

WASHINGTON, D.C. — The Federal Communications Commission last week voted unanimously to refine its price cap plan for local exchange carriers by adding provisions that keep rates within allowable limits.

The FCC proposed adding a mechanism that will force local carriers to share profits with customers by lowering rates if profits exceed preset ceilings. It also proposed a revised "automatic stablizer," which had been incorporated into an earlier price cap plan engineered by former FCC Chairman Dennis Patrick. This stabilizer would guarantee carriers a minimum profit level. Current FCC Chairman Alfred Sikes said the new provisions are an attempt to balance the interests of users and carrier shareholders.

The price cap plan, which would regulate telephone service rates rather than carrier profits, is expected to increase carrier efficiency and provide an incentive to cut costs by allowing carriers to keep any profits they generate.

Users and carriers will now have an opportunity to comment on the price cap plan with the new provisions.

The FCC left open the specifics of the modifications, asking the industry to submit comments on what profit levels should trigger the sharing mechanism, how much profit carriers will share and what figure should be established for carriers' minimum profit level. The plan is scheduled to take effect Jan. 1, 1991.

The industry will also have an opportunity to comment on previous provisions of the plan, some of which have been controversial. The FCC is holding firm on its proposal to require the local exchange carriers to hold future price increases to 3% below the level of inflation. This so-called productivity factor will supposedly guarantee that customers will save more under price cap regulation than if the current rate of return system were continued.

The agency is still planning to make price caps mandatory for the regional Bell holding companies and the major independent carriers. Smaller independent telephone companies can elect to adopt the plan.

— Anita Taff

EC gets PTTs to drop scheme

continued from page 1

how much private-line prices will fall, nor would he name which carriers will be affected most. But he did predict that the decision will help the European Commission push carriers throughout the Common Market to align international rates more closely with the costs of providing service.

Any move in this direction would be a boon to users. According to Ovum, Ltd., a consultancy in London that published a study on the subject last year, international private-line rates on the continent are priced four to 20 times above cost.

For example, Ovum figured the cost of providing half of an international 200 km analog leased line in Europe is about $2,200 per year, plus or minus 50%. Yet the company found that European carriers charge between $11,000 and $42,000 for the circuits.

According to European Commission officials, one of the principal reasons international private lines are so expensive in Europe is that national carriers set prices through joint agreements such as the Recommendation on the General Principles for international leased circuits.

The 26 members of the Conference of European Postal and Telecommunications Administrations (CEPT), which represents all of Western Europe's major carriers, established this recommendation in 1988, although similar arrangements have been used before to guide carrier pricing policies.

The 1988 recommendation called for surcharges of 30% on all international leased circuits carrying third-party traffic — which is often defined by carriers as any traffic not originated by the firm that bought the circuit.

The same surcharge was also recommended for international leased lines that dump traffic into the public network.

In addition, the agreement outlined formulas for calculating international circuit rates that commission officials say are unrelated to cost and lead to inflated prices.

The European Commission argued that these provisions place an unfair burden on international network users and restrict competition in international value-added networks.

Commission officials threatened legal action unless the CEPT carriers withdrew the provisions. In response, CEPT late last month abandoned the entire recommendation, a fact that came to light when the European Commission issued a statement saying, among other things, that it would accept another recommendation only if it led to "economic advantages," such as lower leased-line prices or tariffs closer to actual costs.

Despite the European Commission's optimism that the move will benefit users, analysts predicted few immediate changes.

Barry McAdam, a senior consultant with Associated International Information and Technology, Ltd., a London consultancy, said the only CEPT carrier that had actually adopted the 30% surcharge was Finland's national carrier, although carriers in Belgium, France and Spain had planned to do so. He said that forcing carriers to drop their mutually recognized international tariff formulas will take away one of the tools used to gouge users, but he predicted few immediate tariff readjustments.

Systems Center gets Net/Master

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opments International Pty., Ltd. (SDI), the Australian company that developed and owns Net/Master. SDI sold marketing rights to the products to Cincom in 1984. Last week's announcement assures that Net/Master development, distribution and support will, for the first time, be under one roof when the deal is completed next month.

The announcement also spells the end of ongoing litigation between Cincom and SDI over the terms of their marketing agreement. Some analysts and users said the litigation was hampering Net/Master enhancements and third-party agreements to tie the product in with other vendors' net management systems ("Users see promise in Net/Master buyout," *NW,* Jan. 15).

The litigation "is pretty much going to go away when these deals are closed," said a Systems Center spokesman. "We're not going to sue ourselves."

The combined Cincom and SDI revenues for Net/Master in 1989 were $35 million, so Systems Center should be able to recoup the $43.5 million price tag in a relatively short time, the spokesman said. The price also leaves Systems Center with ample resources for Net/Master research, development and support, he said.

"If you look at our balance sheet, we've got over $20 million in the bank, so that's not a problem," the spokesman said.

Systems Center will raise the $43 million to acquire SDI by issuing new Systems Center stock as opposed to cash out of hand.

AT&T wrestles SDN restraints

continued from page 2

Bergen Brunswig Corp., a drug wholesaler based in Orange, Calif., signed up for a nationwide AT&T SDN in October 1989. All 36 sites were to use switched access and be on-line in December. But only half the sites are currently on the network.

"We made a presentation to senior management that projected savings of roughly $40,000 a month once the [entire] net was on-line," said Dyanna Winn, telecommunications and office systems director for Bergen Brunswig. "The savings have not yet come to pass, and that has created a major problem.

"AT&T can talk to you about provisioning SDN service all they want, but in the final analysis, they're really at the mercy of the [local exchange carrier]," Winn said.

Glenn Starr, SDN product manager for AT&T, said one of the obstacles it must contend with is checking local exchange carrier files before actually provisioning SDN service. With dedicated access, the user or AT&T simply buys the access link.

But with switched access, AT&T has to get the local exchange carriers to provide a list of access lines used by each location and the main billing number for each site the user wants to add to the SDN. The more time it takes to locate and verify this data, the longer it takes to bring up the trunks.

Once AT&T asks the local exchange carriers to change the appropriate customer trunks to SDN, it can take 15 to 30 days before the changes are implemented, Starr said. But even when they are changed, the local exchange carriers often fail to inform the requesting carrier or the user about the switch, he said.

Part of the problem stems from the fact that the service consultants AT&T used to handle most aspects of service provisioning were inexperienced, Starr said. The consultants "didn't know how to deal in the [local exchange carrier] environment," Starr admitted.

To rectify the situation, AT&T set up seven provisioning data centers across the country in late 1989 and staffed them with 300 network technicians from its Network Operations Group.

But one SDN user said privately that the process still needs work. "Although we've had no problems with dedicated access sites, we are still having problems finding out when switched access sites are brought up on our SDN," he said. "For the most part, we don't know when our sites are on the network."

Nonetheless, AT&T is planning big advances. Starr said that beginning next month, the carrier will be able to add dedicated access sites in 15 days, switched access sites in 15 days and bring a new SDN net up in 30 days.

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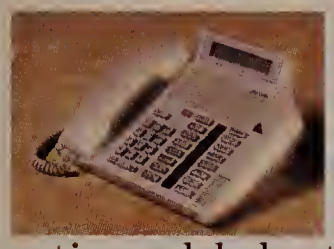

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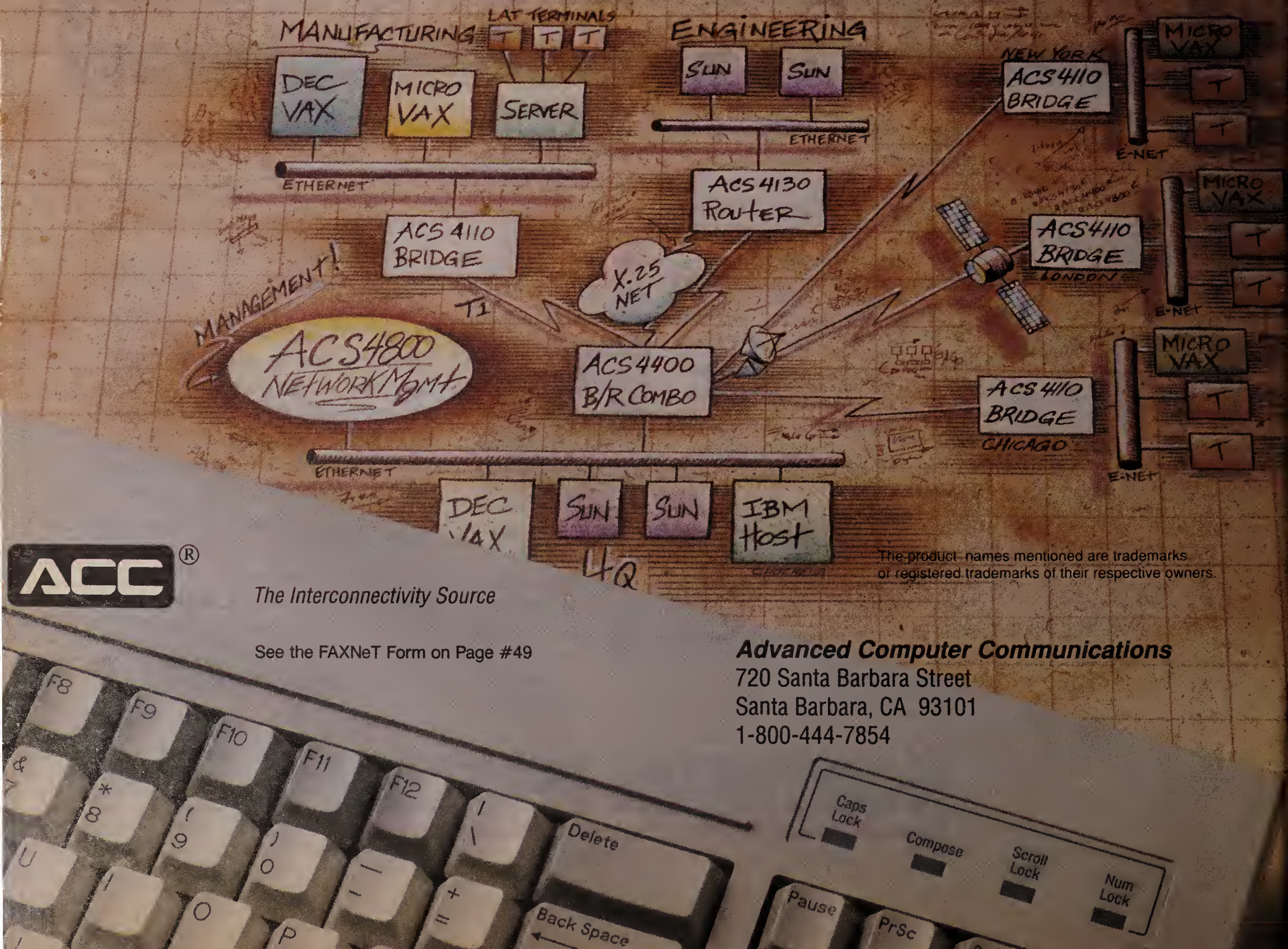

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Unforeseen problems that can put the bite on your network

Creating a monster

By JAY EAGLSTUN

As the manager of a small software development group, it's my job to make sure the office machine runs smoothly. One aspect of this involves my staff's daily lunch routine. Usually around 11:30 a.m., staff members snap out of their zombie-like programmer's trance, emerge from their offices and in unison, announce that it's time for lunch. We would quickly agree on a place to eat, pile into a car or two and drive off for our daily midday break from the grind.

However, after several months, we began to have trouble selecting an eatery that everyone found agreeable. So at 11:30 a.m., we would convene in the lab and discuss possibilities for lunch. After 15 or 20 minutes, we would finally sort out all of the details and choose a place.

Although this was acceptable protocol to my staff, I felt somewhat guilty about spending so much of the company's time trying to agree on a place for lunch. So I came up with what I thought was a relatively simple solution. I made a list of all the restaurants in the area that I liked and had everyone on my staff add to it the places they liked. Then the list was passed around again and each person was to mark each restaurant with a "+" for like, "0" for acceptable, or "—" for forget it, no way. Any restaurant with a majority of "—"s would be deleted from the list. That night, I had the list pared down to 80% of its original size, yielding a fairly comprehensive list of choices that would ensure variety to our outings.

Next, I entered each restaurant into a data base and wrote a 10-line program to randomly pick one. We all agreed to eat at whichever restaurant the program picked. Thus was conceived and born the Net Lunch Program.

Everybody went along with this game for about a week. Then one day, a rebel in our midst refused to go to ***the chosen place***. It turned out that no one was happy with the lunch program. Discord filled the ranks, the lunch group splintered and bad vibes began to creep into the office. I had to do something, and I knew I was on the right track with this program; it just needed a few modifications. So I tweaked it a bit and the next day released Version II of the Net Lunch Program. The program would now select five restaurants from which we would vote for a winner.

However, we soon ran into some problems with this version, too. First, the lunch program ran on a DOS computer and occasionally during lunchtime, that particular computer was in use compiling our real product. Whenever that happened, we had to resort to our old verbal method of debating where to go. Second, the computer seemed to like some restaurants and shun others; there was no fairness to the algorithm. So I made a few more modifications.

First, I made the lunch program accessible to everyone on our network. I wanted to use a well-known standard to promote the widest possible connectivity. Since my company is a software developer, we routinely use Transmission Control Protocol/Internet Protocol, Network File System, NetWare and our own home-brew Open Systems Interconnection protocols, all standards in their own right. Our network is Ethernet-based and consists of 10 personal computers, a Sun Microsystems, Inc. workstation, a Novell, Inc. server, a mini microcomputer running our OSI protocol stack, a Xenix system, a Motorola, Inc. Delta box running Unix, and a couple of Apple Computer, Inc. Macintoshes connected to the Ethernet via gateways.

After careful deliberation, I decided to implement the lunch program on my Unix system because I had access to plenty of spare Unix terminals in the lab and could use one without disrupting our regular work. With this breakthrough, I could now use the standard Department of Defense terminal program, Telnet, to log on from any of our other computers and run the lunch program.

Eaglstun is manager of the Tempe, Ariz.-based Tempe Development Center, a software development group of Communication Machinery Corp.

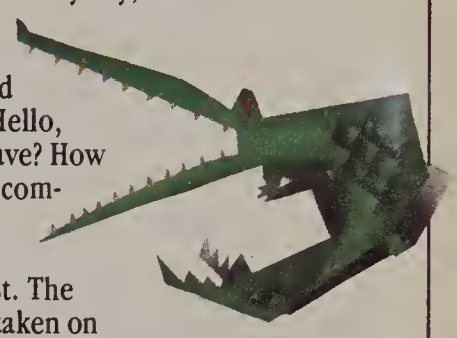
Next, I added a new field to the data base that counted the number of times the restaurant was chosen. Using the counter, the lunch program would discard any candidate whose number was too high. Another field was added that kept track of the dates we went to each place. Four nights later, I was on-line with Version III of the new, improved lunch server program.

After a few days of the new net lunch regimen, suggestions for enhancements started pouring in. Many staffers said they thought this program could be easily modified to run as a server on Unix. Furthermore, since everybody already had an electronic mail program, why couldn't the lunch server select five restaurants, send mail to everyone on the net, ask for a yea or nay vote, collect the results and broadcast the chosen restaurant back? To top it off, I wouldn't have to manually update the data base.

I implemented the enhancements by writing a terminate-and-stay-resident program, and soon Version IV of the Net Lunch Program was on-line. The new lunch server would now wake up at 11:30 a.m., select five places based on count and frequency of use, and send a message to the users logged onto the network. The user mail program would pop up a lunch menu, wait for a vote, then inform us of the decision.

This version worked for a while, too. But I failed to take into account the one major variable that plagued us from the beginning: humans. The lunch program kept getting stuck because people were voting against all the selections. They wanted more control and flexibility, and thought the server needed more data to make a more informed decision.

Right about then, office management began to take on a new appeal to me, so I assigned a programmer to collect all of the ideas for the "final" version. Several weeks later, Version V of the lunch program was released. It now contained heuristic algorithms and a wealth of information on each restaurant. While I now could say "I want pizza today," someone else could say "I want salad," and the program would attempt to select a place with pizza and salad. Around 10:30 a.m., I would receive my first message from the lunch program. "Good morning, Jay. Will you be joining the group for lunch today?" "Yes, I want pizza," I'd respond. "I'm sorry, Jay, but yesterday was pizza. Sorry you were unable to attend. Any other selections?" "OK, sandwich." "Sorry to bother you, Jay, but I have 86 categories of sandwiches in my data base. How about deli? I noticed that the last 20 times we had sandwiches you voted for deli." "OK, deli." I started to resent the impertinence of the program. So I like deli, what of it? Anyway, I didn't care. I was busy. From about 10:30 a.m. to 11:30 a.m. every day, my staff was completely absorbed with the lunch program. Then after lunch, the program would wake up and begin its data collection functions. "Hello, Jay. I hope you enjoyed your lunch. What did you have? How was the food? How was the service? Would you recommend this dish? Did you have dessert? What did you have? Did you like it? How long did it take you to get to the restaurant? The data base was growing — fast. The lunch program was out of control; it seemed to have taken on a life of its own.



I decided to kill the program to restore my disk space and peace of mind.

Things are pretty normal around here now. At lunch, I like to play racquetball or work out at the club. And I now have a new tool for my bag-o-skills. Whenever a solution is presented to me, I ask myself whether it creates more problems than it was designed to solve.

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